UNITED STATES DEPARTMENT OF AGRICULTURE

COOPERATIVE STATE RESEARCH, EDUCATION AND EXTENSION SERVICE

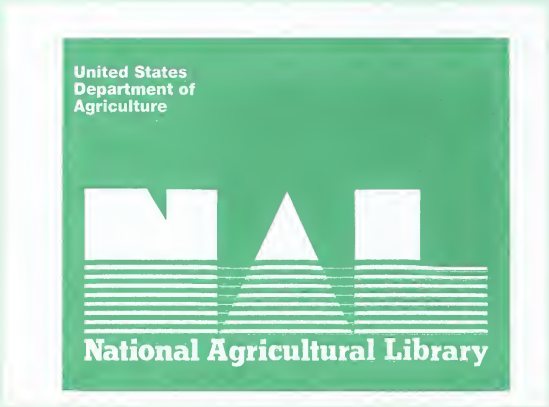
FARM SERVICE AGENCY

NATURAL RESOURCES CONSERVATION SERVICE

IN COOPERATION WITH THE LAND GRANT COLLEGES AND UNIVERSITIES

FY-94 ANNUAL ACCOMPLISHMENTS:

HYDROLOGIC UNIT AREA PROJECTS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FOREWORD

This compiled report is a summary of project accomplishments of the 74 Hydrologic Unit Area projects through FY-94, and it is an attempt to improve upon the FY-93 report. Summaries of impacts, activities, reporting and evaluation methods being used by the projects are listed. Other agencies cooperating with USDA-CSREES, FAS, and NRCS are also listed.
You will notice that the impacts section of the report has numerous documentations of accomplishments being measured in quantifiable terms. This is an improvement over the FY-93 report. We envision much better reporting formats in the future. For more information concerning current or latest accomplishment reports, please contact Mary Ann Rozum at 202-401-4533, fax 202-401-1706, E-mail: mrozum@reeusda.gov

This is a tri-agency project of USDA-
Cooperative State Research, Education, and Extension Service,
Farm Service Agency, and
Natural Resources Conservation Service

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STATE: ALABAMA **PROJECT SIZE:**400,800 acres
PROJECT NAME:SAND MOUNTAIN/LAKE GUNTERSVILLE **STARTED:** 1990
COUNTIES IN PROJECT: MARSHALL, DE KALB, JACKSON, ETOWAH

CROPS/LIVESTOCK: Corn, soybeans, wheat, hay, grain sorghum; swine, beef, poultry, and dairy.

OBJECTIVES: Reduce sediment load in area streams and reservoirs; reduce nutrient and bacterial load in surface and subsurface waters.

IMPACTS:

- Fifty-three percent of planned nutrient management has been applied to date.
- GLEAMS model indicates 136 tons of nitrogen and 25 tons of phosphorus are prevented from leaving 14,358 acres of cropland. This represents 40% reduction in nitrogen and phosphorus leaving the fields.
- Adoption of nutrient management plans resulted in reduced nitrogen application by 5,516 tons and phosphorus by 4,499 tons over 28,360 acres.

ACTIVITIES:

- Conducted tours, field days, lagoon pumping demonstrations to promote water quality.
- IPM training has been held for 1,373 people.
- Installed 58 waste storage structures to date.
- Installed 9,700 feet of terrace primarily for erosion control.
- Conducted a study on marketing poultry litter as cattle feed, soil amendment and fertilizers.
- Utilized eight Resource Management plans to demonstrate that farmers following a complete farm management plan can reduce soil losses to tolerance and still maintain farm income.
- Conducted well testing and well samples were analyzed for contaminants.
- Constructed a wetland to study the breakdown of animal wastes.
- Conducted lagoon pumping demonstrations with 580 people in attendance.

OTHER AGENCIES: Tennessee Valley Authority, Alabama Department of Agriculture, Alabama Experiment Station, and Alabama Department of Health.

REPORTING & EVALUATION: Monitor tributary streams; sample wells and springs; GLEAMS and AGNPS models will be used.

STATE: ALABAMA **PROJECT SIZE:** 248,800 acres.
PROJECT NAME: RYAN CROOKED/ROCK CREEK **STARTED:** 1991
COUNTIES IN PROJECT: CULLMAN, WINSTON
CROPS/LIVESTOCK: Corn, soybeans, wheat, hay, cotton, peaches, peacans, poultry, swine, dairy, and beef.

OBJECTIVES: Reduce the level of nutrients, bacteria and sediment in area streams and lakes; reduce the level of nitrates and bacterial contamination in groundwater; control erosion; implement long range program in water and land treatments.

IMPACTS:

- Adoption of waste utilization by 2 dairies, 51 beef, 36 poultry and 2 swine operations on 6,490 acres resulted in an estimated 571 tons of nitrogen and 461 tons of phosphorus from manure being utilized rather than entering streams.

- Estimates show that 1,300 or 43 percent of the livestock producers have pollution prevention plans and 9.5 percent currently have a waste management system in place.

ACTIVITIES:

- To date, nutrient management plans have been implemented on 5,383 acres of cropland, installed 24 waste storage structures, 4 waste treatment lagoons, 16 ponds and 8,960 feet of fencing.
- Approximately 486 rural households are currently disposing of toxic waste containers safely.
- A dead bird fermentation project has been implemented on a farm in Cullman County.
- Conducted demonstrations on broiler litter use on field crops.
- Held meetings, tours, field days, one-on-one contacts to promote project goals.
- A total of 1,400 producers have successfully located livestock confinement areas downslope.
- A total of 125 producers representing 22,600 acres were trained for restricted use pesticide permits.

OTHER AGENCIES: Cullman County Health Department, Alabama Department of Environmental Management, U.S. Geological Survey, Fisheries Department at Auburn University, and the Environmental Protection Agency.

REPORTING & EVALUATION: Collect baseline data, perform biological and water sampling, and perform rainfall event sampling.

STATE: ARIZONA
PROJECT NAME: CASA GRANDE/COOLIDGE
COUNTY IN PROJECT: PINAL

PROJECT SIZE: 670,000 acres.
STARTED: 1990

CROPS/LIVESTOCK: Cotton, wheat, barley, alfalfa, sorghum, pecans, grapes, melons, vegetables; dairy.

OBJECTIVES: Reduce loss of nitrate nitrogen below the root zone.

IMPACTS:

- Adoption of irrigation water management practices such as the lining of ditches, land leveling and the installation of water control structure has improved irrigation efficiency by 20 percent.

ACTIVITIES:

- To reduce nutrient leaching and save water, the following irrigation water management practices have been installed to date: 46,180 feet of concrete lined ditches, 1,470 acres of land leveling, 439 water control structures, and 26,563 feet of irrigation pipelines.
- Plans have been made by a number of growers to install conservation measure on 5,683 acres without the use of cost-share dollars.
- Monitoring the loss of pesticides below the root zone has not detected any pesticide movement within that zone.
- Based on ongoing analysis, trends showing improvement or degradation of groundwater quality have not been seen to date.
- Conducted tours, fairs, in-service training, meetings, to promote water quality.
- Planned and implemented conservation practices on 5,864 acres of cropland.
- Planned and implemented nutrient and pesticide management practices.
- Published brochures, factsheets, news articles, to promote project goals.

OTHER AGENCIES: USDA-Agricultural Research Service, Arizona Department of Environmental Quality, U.S. Geological Survey and the Arizona Department of Water Resources.

REPORTING & EVALUATION: Impacts of grower irrigation and nutrient management practices sampling, to observe movement out of the root zone and into the shallow vadose zone.

STATE: ARIZONA
PROJECT NAME: WEST MARICOPA
COUNTIES IN PROJECT: WEST MARICOPA

PROJECT SIZE: 1.2 million acres.
STARTED: 1991

CROP/LIVESTOCK: Cotton, wheat, alfalfa, barley, vegetables; dairy and beef cattle.

OBJECTIVES: Reduce potential for leaching nitrogen fertilizer into the aquifer.

IMPACTS:

- To date, 63,875 tons of dairy manure has been effectively utilized on 9,027 acres of cropland as a result of producer adoption of nutrient management plans.

- Improved irrigation efficiency by saving 29, 094 acre inch of water over 2,178 acres.

ACTIVITIES:

- Irrigation land leveling has been completed on 1,397 acres for the application of nitro management practices.
- Professional quality 4'x 6' poster describing the purpose of the HUA projects has been produced for use at public events.
- Established field plots to evaluate field operations.
- Developed a nitrate database.
- Adoption of nitrogen management practices for water quality protection has resulted in the design and construction of 154 waste storage ponds, 26,709 ft. of irrigation pipelines, and 93,908 feet of concrete lined ditches, to date; to reduce nitrate loading into surface and groundwater and improve irrigation efficiencies.
- Developed and implemented the infrared thermometry to measure crop water stress index and aid in making irrigation management decisions.
- Established Pesticide Applicator Training and Integrated Pest Management training program.
- A mobile irrigation laboratory is used to observe irrigation events and make recommendations on physical changes to improve irrigation efficiencies.

OTHER AGENCIES: Arizona Department of Environmental Quality, Arizona Department of Water Resources, USDA-Agricultural Research Service, and the U.S. Geological Survey, and the Environmental Protection Agency.

REPORTING & EVALUATION: Monitor vadose zone, prepare user-friendly data base, water supply sampling, and chemical monitoring.

STATE: ARKANSAS
PROJECT NAME: MOORE'S CREEK
COUNTIES IN PROJECT: WASHINGTON

PROJECT SIZE: 47,122 acres.
STARTED: 1990

CROPS/LIVESTOCK: Soybeans, sorghum, wheat, orchards, apples, pasture; and poultry, turkey, beef, swine, and dairy.

OBJECTIVE: Reduce nitrogen and phosphorus transport in the watershed.

IMPACTS:

- Soil testing conducted to monitor nutrient uptake on one farm indicated that nitrate transport as monitored by grab samples was reduced by 15 percent, and phosphorus reduced by 75 percent.
- Implementation of nutrient management plans resulted in reduced application of 3 tons of poultry litter per acre.
- Adoption of waste utilization on 19,954 acres resulted in reduced nitrogen application of 3,352,272 pounds and 458,942 pounds of phosphorus from manure being utilized rather than entering streams.

ACTIVITIES:

- Designed promotional activities that included newsletters, TV programs, radio broadcast, and newspaper articles to increase project awareness.
- Published brochures and factsheets to promote water quality.
- Conducted one-on-one interviews, meetings, demonstrations, and tours to enhance project awareness.
- Established a waste management demonstration farm to raise poultry and beef cattle.
- In resolving the animal waste management problem, 10 new facilities have been constructed and 11 facilities improved on 1,720 animal units of dairy operation covering 4,875 acres of cropland.
- To date, 30 new chicken facilities have been constructed and 46 improved on 7,119,000 animal units covering 10,229 acres of cropland.

OTHER AGENCIES: U.S. Geological Survey, Arkansas Department of Pollution Control and Ecology, Farm Bureau Cattlemen's Association, Tyson Food, Cargill, Inc., Simmons Industries, George's, Inc.

REPORTING & EVALUATION: Test local wells and springs for nitrates; sample lakes to establish nutrient levels

STATE: ARKANSAS **PROJECT SIZE:** 105,768 acres.
PROJECT NAME: LONG CREEK **STARTED:** 1991
COUNTIES IN PROJECT: CARROLL, BOONE
CROPS/LIVESTOCK: Fruits, grain sorghum, orchardgrass, fescue, wheat; poultry, swine, dairy, and beef cattle.
OBJECTIVES: Reduce nitrogen and phosphorus levels; reduce nutrients and bacteria delivered to Table Rock Lake; quantify surface and groundwater effects of conservation; install conservation practices.

IMPACTS:

- Estimated reduction of nutrient loading of 30 percent has occurred in the watershed due to proper waste utilization.
- GLEAMS model indicates 180 tons of nitrogen and 5.5 tons of phosphorus are prevented from leaving the fields. This represents 50% reduction in N and P leaving the fields.
- Reduced nitrogen (NO_3-N) application by 177 lbs/ac on 4,690 acres for a total of 830,130 lbs. savings in nitrogen that was prevented from entering the water supplies.
- Reduced phosphorus (P_2O_5) application by 142 lbs/ac on 4,690 acres for a total of 665,980 lbs. savings in phosphorus that could find its way to water supplies.
- The birds in the watershed produce approximately 140,000 tons of manure annually and these are effectively utiliized by surface application.
- About 460,000 tons of manure are produced from poultry, dairy and unconfined beef cattle are effectively utilized in the watershed.

ACTIVITIES:

- News articles, newsletters, television coverage, and radio spots serve to promote water quality.
- Soil testing has been done on 145 farms with 19,750 acres of crop or pasture land and 32,000 total acres. One-hundred and forty-five ground and surface water tests have been collected.
- To date, 193 poultry manure samples have been analyzed as fertilizer feed, worked on the basics of feeding livestock dry poultry.
- Eighteen dead bird composters and 3 stacking sheds built.
- To date, 24 growers have installed freezer units.
- A total of 1,362 ag. producers representing 53,500 acres attended water quality meetings.
- To date, 1,308 ag. producers representing 83,000 acres followed recommendations for fertilizer application rates.
- An estimate of 230 producers representing 6,500 acres used nutrient credits for manure, crop residues or legumes.
- Trained 123 producers with 18,500 acres on use of restricted use pesticide permits.
- Thirty producers with 6,700 acres applied pesticides only when pest scouting information indicated that economic thresholds were reached.
- Thirteen producers with 400 acres selected alternative pesticides to reduce risk of water quality degradation.

STATE: ARKANSAS
PROJECT NAME: LONG CREEK
COUNTIES IN PROJECT: CARROLL, BOONE

PROJECT SIZE: 105,768 acres.
STARTED: 1991

ACTIVITIES CONTINUED:

- To date,nutrient management plans have been applied on 6,900 acres of cropland.
- Installed 4 waste treatment lagoons and 11 waste storage structures, and 61,145 feet of terraces to date.
- About 950 million chickens and turkeys are produced annually in the State.
- Twenty waste management plans for dry litter are formulated annually in the project.

OTHER AGENCIES: U.S. Geological Survey, Arkansas Department of Health, and the Environmental Protection Agency, Tyson Foods.

REPORTING & EVALUATION: Water monitoring, evaluate surface and groundwaters for nitrates, soil samples, monitor edge of field sites, collect water samples, and measure secchi disk.

STATE: CALIFORNIA
PROJECT NAME: WESTSIDE SAN JOAQUIN VALLEY
COUNTIES IN PROJECT: FRESNO, MERCED, KINGS

PROJECT SIZE: 600,000 acres.
STARTED: 1990

CROPS/LIVESTOCK: Cotton, wheat, barley, tomatoes, lettuce, cantaloupes, alfalfa, vegetables, almonds, and corn.

OBJECTIVES: Reduce subsurface drainage, and develop groundwater/soil salinity through improved irrigation water management.

IMPACTS:

- Option of conservation practices for irrigation water management resulted in toxic salt reduction on over 29,450 acres.
- Adoption of conservation practices improved irrigation efficiency by 13 percent on sprinkler irrigation and 26 percent on furrow irrigation (1993/1994 growing season).

ACTIVITIES:

- Published newsletters, videos, brochures and factsheets to promote water quality.
- Developed handbooks on salinity management and surge irrigation. Published and distributed a handbook on low-volume irrigation.
- Conducted workshops on salinity management, furrow irrigation, surge irrigation, and irrigation water management.
- Over 2,200 Earth Team volunteer hours were spent in agroforestry related tasks.
- Approximately 74 water table monitoring floats serving 11,100 acres have been installed in the project.
- Developed 2 water quality videos that have application with salinity and drainage problems.
- Practices implemented to improve salinity include: 16,600 feet of subsurface drainage, 4 waste management systems installed on 54 acres, and water table control on 1,080 acres.

OTHER AGENCIES: U.S. Geological Survey, Environmental Protection Agency, U.S. Fish and Wildlife Service, California (CA) Department of Food and Agriculture, and the CA Department of Fish and Games.

REPORTING & EVALUATION: USDA-Soil Conservation Service is the reporting agency, estimate changes in groundwater quality.

STATE: CALIFORNIA
PROJECT: MORRO BAY
COUNTIES IN PROJECT: SAN LUIS OBISPO
PROJECT SIZE: 44,358 acres
STARTED: 1991
CROPS/LIVESTOCK: Bell peppers, sugar beets, irrigated vegetables, broccoli, flower seed, lettuce, small grain, garbonzo, beans; beef cattle, fresh fish, and shell fish.

OBJECTIVES: Reduce impacts of sediment and other pollutants on streams, wetlands and Morro Bay estuary, and to reduce soil erosion in the watershed.

IMPACTS:

- An estimated 65 percent of the farms in the watershed are implementing the recommended erosion control practices.
- Completed conservation practices on rangeland, cropland, riparian areas and on abandoned landfill that showed a marked increase over previous years.
- Implemented erosion control practices on two farms that saved 1400 and 450 tons/year respectively of soil from entering streams.
- In 1994, application of erosion control practices resulted in the installation of 48,000 feet of fencing, 10 acres of livestock exclusion and 5,750 acres on proper grazing.

ACTIVITIES:

- There has been an increased awareness in the project by landowners and the general public about the need to reduce the impacts of pollutants.
- Conducted meetings on non point source pollution, workshops on conservation plans and practices, and tours of the watershed.
- Developed 4-H watershed science curriculum for youth of ages 9-12.
- Conducted 4-H training sessions and camps which included collecting stream flow, fish and wildlife data.
- Prepared news articles, brochures, fact sheets and poster displays to promote project goals.
- Implemented erosion control practices which have influenced soil savings.
- Promoted conservation plans and cost-share programs through meetings, field tours, press releases, letters, fact sheets and one-on-one contacts.

OTHER AGENCIES: Environmental Protection Agency, California Coastal Conservancy, Central Coast Regional Water Quality Control Board, California National Guard, the Department of Fish, Game and Wildlife Conservation Board and the U.S. Forest Service.

REPORTING & EVALUATION: Monitor riparian and range vegetation and quantify water in four subwatersheds, evaluate the effects of the installation of conservation practices on crop and range-lands. A geographic information system (GIS) was used to develop sediment reduction estimates.

STATE: CALIFORNIA
PROJECT NAME: WEST STANISLAUS
COUNTIES IN PROJECT: STANISLAUS
PROJECT SIZE: 129,000 acres.
STARTED: 1991
CROPS/LIVESTOCK: Beans, peas, tomatoes, broccoli, cauliflower, spinach, sugar beets, irrigated corn, cherries, apples, peaches, nectarines, pears, and plums.

OBJECTIVES: Reduce sediment loading from the watershed; monitor and evaluate non-point source pollution conditions.

IMPACTS:

- Implementation of best management practices for sediment control resulted in the following:
  - Cumulating savings of 617 pounds of DDT isomers since the project began in 1991.
  - Cumulative savings of 337,990 tons of sediment in the watershed.
  - Over 25,081 acres of irrigated lands are no longer sending chocolate brown colored surface runoff to the San Joaquin River which would average 1,500 to 2,000 mg/l of total suspended solids.
- In 1993, farmers improved irrigation efficiency by 18 percent saving an estimated 6,472 acre/feet of water and 136,688 tons of sediment from reaching the river.
- Farmers on the west side have reduced sediment by 80 percent on 21,711 acres of farmland.

ACTIVITIES:

- Established a mobile irrigation laboratory unit in the project, and the end of the Summer of 1993 had performed 23 tests that included furrow, handmove and undertree sprinklers, and drip systems on over 1,526 acres.
- Developed a field demonstration site to quantify nonpoint source pollution associated with furrow irrigation.
- To date, controlled drainage has been implemented on 9,181 acres.
- Developed irrigation water management videos.
- Cost-sharing under agricultural conservation program (ACP) and long term agreements (LTA) were utilized to reduce sediment load in streams.
- Interacted and promoted the project's goals through workshops, one-on-one field consultations, tours, grower information, publications, brochures, and newsletters.
- Developed a Spanish video on controlling erosion and minimizing sediment movement.
- To date, Irrigation water management has been implemented on 12,433 acres.

OTHER AGENCIES: Resource Conservation District, U.S. Navy, Central Valley Regional Water Quality Control Board.

REPORTING & EVALUATION: Models will be used to evaluate the volume of sediment generated in irrigated fields; Monitor and demonstrate the effectiveness of best management practices on controlling pollutants.

STATE: COLORADO **PROJECT SIZE:** 89,850 acres.
PROJECT NAME: PATTERSON HOLLOW **STARTED:** 1991
COUNTIES IN PROJECT: OTERO, PUEBLO
CROPS/LIVESTOCK: Irrigated corn, alfalfa, wheat, sorghum, dry beans, vegetables, melons, onions, tomatoes, and watermelons.
OBJECTIVES: Reduce the amount of salts reaching the river, improve on-farm irrigated water management, reduce over application of nutrients and pesticides, provide Best Management Practices (BMPs) for pesticides, and approve cost share assistance.

IMPACTS:

- Implementation of nutrient management practices in the project resulted in market price of irrigated alfalfa increasing from $34-50 per ton to $80 per ton.
- Adoption of BMPs for nutrient management resulted in reduced nitrogen (NO_3-N) application of 3,416 pounds on 551 acres in 1994.
- Implementation of Integrated Pest Management Practices resulted in reduced Buctril (pesticide) application of 0.15 a.i. (active ingredient) on over 155 acres for a total of 23 pounds a.i.
- Effective use of irrigation water resulted in improved irrigation efficiency by 18% in 1994.
- Adoption of sediment control practices resulted in an estimated 12,690 tons of sediment reduced on over 2,700 acres.
- Irrigation water losses and waste have been reduced by 30 percent in the watershed.
- Demonstration work completed in two sites showed that surge irrigated area used 6.9 inches per acre or 24.1 percent less water than the conventionally irrigated areas.
- Implementation of surge irrigation in 1992 and 1993 resulted in profits that ranged from $49 to $102 per acre.
- Over 50 percent of the project area has been positively affected by nutrient irrigation water management practices.

ACTIVITIES:

- Published newsletters, factsheets and brochures to promote project goals.
- Conducted demonstrations, farm tours, one-on-one sessions to promote water quality.
- Conducted tests to prove that you can save more water by using surge irrigation versus conventional irrigation.
- Implemented Best Management Practices include 78 miles of water conveyance structures and 5,407 acres of nutrient, pest, and other management practices.

OTHER AGENCIES: U.S. Geological Survey, USDA-Agricultural Research Service, Environmental Protection Agency, Colorado State Soil Conservation Board, and the Colorado Water Quality Control Board.

REPORTING & EVALUATION: Monitor and evaluate the soil-plant atmosphere continuum (SPAC), and economic monitoring and evaluation.

STATE: CONNECTICUT **PROJECT SIZE:**1,245,440 acres.
PROJECT NAME: HOUSATONIC RIVER **STARTED:** 1990
COUNTIES IN PROJECT: LITCHFIELD, FAIRFIELD, NEW HAVEN, HARTFORD
CROPS/LIVESTOCK: Silage corn, hay, sorghum, barley, oats, rye, wheat, sunflowers, fruits, vegetables, vineyards; beef, sheep, horses, poultry and dairy.
OBJECTIVES: Reduce soil erosion, reduce phosphorus and sediment loadings to the recreational lakes, reduce/manage the inputs of pesticides and nitrogen to minimize risk of contamination of surface or groundwater, and reduce loading of nitrogen to Long Island Sound.

IMPACTS:

- In 1993, pesticide use was reduced as follows: A.1.= active ingredients (moderate runoff potential)
  1. methopyl 3.9 lbs of a.i on 28 acres (109 lbs a.i total)
  2. atrazine 1.04 lbs of a.i on 431 acres (448 lbs a.i. total)
  3. simazine 1.0 lb a.i. on 233 acres (233 lbs a.i. total)
  4. metolachlor 1.37 lbs a.i on 431 acres (590 lbs a.i. total)
  5. carbaryl 7.0 lbs a.i on 15 acres (105 lbs a.i. total)
- Presidedress nitrogen testing for field corn saved 20 farmers $14.51/acre on 1003 acres for a total savings of $14,560.

ACTIVITIES:

- Conducted integrated pest management and crop management training.
- Trained producers on the use of pre-sidedress soil nitrogen testing, and manure spreader and pesticide sprayer calibration.
- Implemented 20 pest management practices for surface and groundwater protection on 3034 acres to date.
- Implemented animal waste management practices on two dairy farms of 2,000 acres total size.
- Installed nitrogen and phosphorus management practices on 6,464 acres out of 35,000 needing such practices.
- Implemented erosion and sediment control practices on 360 acres out of 7,000 acres needing such practices.

OTHER AGENCIES: Environmental Protection Agency, Connecticut Department of Environmental Protection, Connecticut Department of Health Services, and Connecticut Agricultural Experiment Station.

REPORTING & EVALUATION: Evaluate agricultural waste management systems. Use Erosion/Productivity Impact Calculator (EPIC) which is a computer model to evaluate the effectiveness of nutrient management practices.

STATE: CONNECTICUT **PROJECT SIZE:** 62,664 acres.
PROJECT NAME: SCANTIC RIVER **STARTED:** 1991
COUNTIES IN PROJECT: HARTFORD, TOLLAND
CROPS/LIVESTOCK: Ornamentals, tobacco, vegetables, small fruits, orchards, corn; beef, hogs, sheep, horses, and dairy.

OBJECTIVES: Control of soil erosion and reduce nutrient and pesticide losses to surface and groundwater resources, and reduce loading of nutrients, sediments, and pesticides.

IMPACTS:

- Integrated Pest Management strategies adopted within the watershed resulted in a total of 22,914 pounds of pesticide active ingredients (AI) being saved.
- 19 growers and grounds keepers with a total of 3,826 commodity acres achieved 47% reduction in the pounds of pesticide active ingredients used in 1993.
- To date, the use of four pesticides (atrazine, chlorpyrifos, metolachler and oxamyl) found in groundwater was reduced by a total of 28,359 pounds AI (over 14 tons)
- Implementation of BMPs resulted in an estimated 29 lbs of nitrogen (NO_3-N) being utilized over 284 acres for a total of 8236 lbs of nitrogen.
- Created two traveling displays for use in the project.

ACTIVITIES:

- To date, June nitrate testing has been implemented on 2200 acres; waste utilization on 4,465 acres and 1,040 feet of tile outlet has been installed.
- Adoption of waste utilization by 11 dairies resulted in reduced nutrient loadings on 1,730 acres.
- Held meetings, workshops, and tours to promote project goals.
- Published newsletters, factsheets and brochures on HUA activities.
- Promoted cost share programs and long term agreements.

OTHER AGENCIES: Environmental Protection Agency, Connecticut Department of Environmental Protection, Connecticut State Department of Health Services, and Connecticut Agricultural Experiment Station.

REPORTING & EVALUATION: Evaluate agricultural waste management systems. Use Erosion Productivity Impact Calculator (EPIC) to evaluate effectiveness of nutrient management practices.

STATE: DELAWARE **PROJECT SIZE:** 172,800 acres.
PROJECT NAME: INLAND BAY **STARTED:** 1990
COUNTIES IN PROJECT: SUSSEX
CROPS/LIVESTOCK: Corn, soybeans, wheat, barley, sorghum, vegetables; and broilers.

OBJECTIVES: Reduce nonpoint source pollution from 300 farms in the Inland Bay's watershed through nutrient management, poultry carcass composting, integrated pest management, water resource management and protection, farmstead management, education and research.

IMPACTS:

- Implementation of Best Management Practices (BMPs) on nutrient management resulted in nitrogen application being reduced by an average of 118 lbs/ac on 43,502 acres for a total nitrogen (NO_3-N) reduction of 5,133,236 pounds. Phosphorus application was reduced by an average of 96 pounds per acre on 43,502 acres for a total phosphorus (P_2O_5) reduction of 4,176,192 pounds.

- The we C.A.R.E. (Comprehensive Agricultural Resources Effort) water quality planning and implementation process started in the Inland Bays project is being adapted in other Delaware watersheds.

ACTIVITIES:

- Sixty waste storage structures, 36 composters, 203 manure analysis, and 70 manure spreader calibrators were installed on 43,502 acres.
- Developed a WE C.A.R.E. "Field recordkeeping" notebook.
- Established a database to accurately determine project accomplishments.
- Provided nutrient recommendations to producers on 43,502 acres.
- Surveyed cooperators to determine practices adopted.
- Conducted tours, meetings, exhibits, and demonstrations to promote water quality.
- Prepared and distributed factsheets, videos, newsletters, and public service announcements on water quality.
- Promoted conservation planning and cost share programs.

OTHER AGENCIES: Sussex Conservation Districts, Delaware Department of Natural Resources and Environmental Control, Delaware Department of Agriculture and Forestry.

REPORTING & EVALUATION: Using nitrate Leaching and Economic Analysis Package (NLEAP) and Agricultural Non-Point Source Pollution (AGNPS) computer models for evaluations.

STATE: FLORIDA **PROJECT SIZE:** 540,000 acres
PROJECT NAME: MIDDLE SUWANNEE RIVER **STARTED:** 1990
COUNTIES IN PROJECT: LAFAYETTE, SUWANNEE

CROPS/LIVESTOCK: Corn, cotton, soybeans, watermelons, peanuts, tobacco, dairy, and poultry.

OBJECTIVES: Protect surface and groundwater through effective waste-management practice; develop and demonstrate dairy and poultry waste composting, develop forage analysis program.

IMPACTS:

- Integration Pest Management practices adopted by producers resulted in an estimated 65 percent reduction in pesticide use on all cotton acres.

- An estimated 85 percent of homeowners have reduced or eliminated the application of phosphorus.

ACTIVITIES:

- Conducted demonstrations on carrot and corn crops to show different phosphorus fertilization treatments.
- Established a laboratory to provide nutrient analysis of manures and forages.
- Developed 13 animal waste composting facilities as an alternative means to waste disposal.
- Conducted a demonstration on Winter resource farm pasture and Hayland management in cooperation with Florida A&M University.
- Adoption of improved application resulted in the installation of 1 dairy operation over 120 acres and 14 poultry operation on over 132 acres for animal waste management.
- Implementation of Best Management Practices resulted in effective installation of the following: 15 waste management systems, 8,000 ft. of fencing, 1,714 acres of nutrient management; and 112 wells tested to date.

OTHER AGENCIES: U.S. Geological Survey, the Florida Department of Agriculture and Consumer Services, and the Florida Department of Environmental Protection.

REPORTING & EVALUATION: Survey will be established to monitor and analyze water quality data from sampling stations; survey farmers' attitudes on cost share programs, Farm*A*Syst program is being implemented.

STATE: FLORIDA
PROJECT NAME: KARST CROPLAND
COUNTIES IN PROJECT: JACKSON
PROJECT SIZE: 297,350 acres.
STARTED: 1991

CROPS/LIVESTOCK: Peanuts, corn, cotton, soybeans grain sorghum, small grains (oats, rye, and wheat), water melons and tomatoes; swine, dairy and beef cattle.

OBJECTIVES: Reduce nutrient and pesticide impact in project area, develop conservation plans and groundwater monitoring programs, produce of leaching, runoff and erosion maps.

IMPACTS:

- Due to scouting for pests, some land units have reduced pesticide application as much as 50 percent.
- Effective irrigation water management resulted in reduced cropland.
- Participation by 25 farmers and cropdusters in the pesticide recycling program in 1994, resulted in approximately 4,500 pounds of plastic jugs being collected. The importance is that about 6,000 pesticide jugs with the potential to contaminate groundwater, will be removed from the environment.
- Irrigation efficiency has increased by 8 percent to enable farmers irrigate less, more often instead of applying too much and not often enough.

ACTIVITIES

- In 1994, two chemical mixing centers were completed and serve as mixing locations for almost 900 acres of cropland.
- Conducted soil testing on 1,484 acres of cropland.
- Conducted a peanut weed control demonstration with 167 farmers attending in 1994.
- Established demonstration plots for crop rotation and weed control.
- Conducted soil testing on 1,484 acres and crop residue has been used on 1,690 acres to date.
- Conducted tours, meetings, surveys; wrote newsletters, articles on project goals.
- To date, a total of 58 nutrient management plans have been completed.
- Over 57 cooperators have been trained on scouting, pest identification, sprayer calibration, and pesticide disposal.

OTHER AGENCIES: Environmental Protection Agency, Florida Department of Environmental Protection, Florida Department of Agriculture and Consumer Services, and the Soil and Water Conservation District.

REPORTING & EVALUATION: Monitor wells, collect field data, and monitor groundwater.

STATE: FLORIDA **PROJECT SIZE:** 117,014 acres.
PROJECT NAME: LAKE APOPKA **STARTED:** 1991
COUNTIES IN PROJECT: LAKE, ORANGE
CROPS/LIVESTOCK: Vegetables, sod, citrus, timber, pasture.
OBJECTIVES: Reduce levels of nitrogen and phosphorus discharged into Lake Apopka.

IMPACTS:

- Application of irrigation water management practices have resulted in effective installation of 20,856 ft. of irrigation canal, 10,535 acres of irrigation water management, 7,076 acres of water table control.
- By reducing the amount of phosphorus discharged with water, there were cost savings to the individual farmers of $460,000 in fertilizer costs.
- In 1994, 90 percent of the producers in the project followed soil and tissue testing recommendations.
- Implementation of resource management plans on all vegetable (12,750 acres), farms has yielded better irrigation efficiency and even water distribution.
- Adoption of nutrient management plans in histols resulted in the following reductions: phosphorus ($P_2 0_5$) 717,949 pounds, net nitrogen (N) 396,330 pounds and potassium ($K_2 0$) 1,107,721 pounds.
- Reductions in nutrient application have been more noticeable in carrots and sweet corn with an average $P_2 O_5$ application being reduced by 38 lbs/acres (53 percent) on carrots and 35 lbs/acres (49 percent) on sweet corn.
- Irrigation efficiency of 2.7 percent has been realized on annual water application of over 2,375 ft/acres.

ACTIVITIES:

- Implemented practices such as land leveling, water table control, nutrient and pesticide management, and irrigation management have resulted in reduced nutrient application.
- Installed low volume irrigation systems in citrus fields to reduce overall water use and amount of drainage into the lake.
- Established on-farm fertilizer demonstration sites with cooperators, 1,095 people have attended nutrient/pesticide workshop since the project started.
- Conducted tours, meetings, prepared newsletters to promote project goals.
- To date, nutrient management plans have been installed on 10,519 acres of cropland.

OTHER AGENCIES: Lake Gem Farms, Zellwood Drainage District Board of Directors.

REPORTING & EVALUATION: Tissue analysis used in monitoring; data collection; water table monitoring, evaluate field test kits.

STATE: GEORGIA **PROJECT SIZE**:219,950 acres.
PROJECT NAME: LITTLE RIVER/ROOTY CREEK **STARTED:** 1991
COUNTIES IN PROJECT: JASPER, MORGAN, NEWTON, PUTNAM, AND WALTON

CROPS/LIVESTOCK: Corn, sorghum, cotton; beef, turkeys and dairy.
OBJECTIVES: Improve management of livestock, poultry, cropland, pasture and streambanks.

IMPACTS:

- Farmers who regularly use Nutrient Management Plans have saved over $5,000 to $25,000 in commercial fertilizer costs by using animal waste.
- Conservation practices applied on 3,430 acres of land resulted in reduced annual soil erosion and sediment yield of 27,294 tons.
- Adoption of waste utilization on 3,430 acres has resulted in 41,193 tons of animal waste annually produced on the farms being effectively contained and managed.
- Management of animal waste (41,193 tons), reduced the commercial use of nitrogen by 123,579 pounds which reduced the possibility of pollution to receiving waterbodies.
- Implementation of the Agricultural Non-Point Source Model (AGNPS) showed that applied practices for FY 93-94 reduced nutrient loading from confined livestock operations to receiving waters by 173 parts per million (PPM) soluble nitrogen and 33.9 PPM soluble phosphorus.

ACTIVITIES:

- Adoption of 77 nutrient management plans in the project has resulted in 38 lagoons being pumped out in the watershed.
- Published newsletters, brochures, and factsheets to promote project activities.
- Conducted tours, workshops, demonstrations and field days to promote water quality.
- To date, 42 active long term agreements covering 3,884 acres are in various stages of implementation within the project.
- Conducted 279 well testings in the project area.
- Developed a groundwater model to educate the public on pollution.
- Constructed artificial wetlands to process waste.

OTHER AGENCIES: Environmental Protection Agency, U.S. Geological Survey, Georgia (GA) Power Company, GA Dairy Association, and GA Farm Bureau, GA Natural Resources, County Dairy Associations.

REPORTING & EVALUATION: Water chemistry sampling, and flow data collection, conservation reporting and evaluation system will be used to monitor progress, and evaluate artificial wetlands. Lagoon and domestic well testing is being conducted.

STATE: HAWAII
PROJECT SIZE: 70,700 acres.
PROJECT NAME: KAIAKA-WAIALUA
STARTED: 1991
COUNTIES IN PROJECT: HONOLULU
CROPS/LIVESTOCK: Sugar cane, pineapples, pasture, bananas, taro, lettuce, beans, orchards; cattle, goats, horses.
OBJECTIVES: Reduce agricultural chemical pollution, control sediment sources; implement effective education and public involvement.

IMPACTS:

- Over a three year period, Integrated Pest Management (IPM) practices have resulted in decreased pesticide use by 920 lbs a.i. within the watershed.
- Readership of newsletter increased from 400 to 2,000 people.
- Reduced sediment loading by 20623 tons/yr in the bay.
- Reduced phosphorus loading rate by 5156 lbs/year in the bay.
- To date, 45 percent of the agricultural land has nutrient and pesticide management plans.
- Adoption of Best Management Practices resulted in estimated reductions of 614,300 lbs of nitrogen, 11,400 lbs of phosphorus and 319,930 lbs of sediment that are prevented from entering the recieving waters in FY 94.

ACTIVITIES:

- A total of 15 school/organization visits have been conducted regarding water quality education reaching over 28,300 people.
- Cooperatively developed a Comprehensive Resource Management Plan.
- Sponsored conservation awareness and field tours.
- Developed brochures, pamphlets, mailing list, bulletins, and newsletters to promote water quality.
- Produced a slide show of the project.
- Installed erosion/sediment control practices for 28 producers on 34,024 acres of land.
- Developed a mascot theme for the project.
- Integrated Pest Management work looks at developing new resistance cultivates and the introduction of parasitic pests for control.

OTHER AGENCIES: Environmental Protection Agency, Honolulu Department of Health, U.S. Geological Survey, Honolulu Board of Water Supply, and the U.S. Army.

REPORTING & EVALUATION: Chemical and water monitoring, and on-site evaluations.

STATE: IDAHO **PROJECT SIZE:** 848,208 acres.
PROJECT NAME: SNAKE-PAYETTE **STARTED:** 1991
COUNTIES IN PROJECT: ADAMS, CANYON, GEM, PAYETTE, WASHINGTON
CROPS/LIVESTOCK: Alfalfa, barley, dry beans, corn, hops, oats, onions, peppermint, potatoes, seed crops, spearmint, sugarbeets, wheat; beef, dairy, sheep, chicken and horses.
OBJECTIVES: Reduce pollution from pesticides and nutrients; improve nutrient and pesticide management of crops.

IMPACTS:

- Adoption of nutrient management practices for nitrogen resulted in reduced nitrogen ($N0_3$-N) application of 21 lbs/acres on 364 acres for a total of 7,644 pounds reduced.
- Seventy four percent of NPURG analyses indicated a low potential for leaching.
- Water conservation practices adopted by the producers resulted in irrigation efficiency of 23 percent.
- Approximately 55% of the acreage in the watershed utilizes soil and plant tissue testing as a tool for nutrient management.
- Growers that use dacthal (herbicide) as a band application compared to broadcasting reduced the quantity of chemical applied by one-third.

ACTIVITIES:

- In 1994, the irrigation water management team established a mobile laboratory which conducts on-farm evaluations to ascertain irrigation system performance.
- Conducted tours, demonstrations, and field days to promote water quality.
- Produced a project display for use in meetings, symposia and field days.
- Published factsheets, news articles, brochures reaching 2,500 landowners to promote project goals.
- To date. 26 practices with water quality benefits have been applied through long term agreements.
- Adopted Home*A*Syst with the project.
- A total of 210 pesticide combinations were evaluated using NPURG.
- Implemented nutrient management practices for nitrogen on 2,827 acres.
- Implemented pest management practices for pesticides on 2,827 acres.
- Developed a farm recordkeeping pocketbook and 500 copies were distributed to producers.

OTHER AGENCIES: Environmental Protection Agency, Idaho Department of Health and Welfare Division of Environmental Quality, Agricultural Experiment Station, Idaho Department of Agriculture, Idaho Farm Bureau, Bureau of Reclamation.

REPORTING & EVALUATION: Well sampling; economic evaluation of BMPs; cooperator tracking of BMPs implemented. The following models will be used to evaluate the management of Nitrate Leaching and Economic Analysis Package (NLEAP), Erosion/Productivity Impact Calculator (EPIC), National Pesticide/Soils database and User decision support system for risk assessment of ground & surface water contamination.

STATE: ILLINOIS **PROJECT SIZE:** 250,000 acres.
PROJECT NAME: ILLINOIS RIVER SANDS **STARTED:** 1990
COUNTIES IN PROJECT: MASON
CROPS/LIVESTOCK: Corn, soybeans, wheat, cucumbers, potatoes, tomatoes, and melons.
OBJECTIVES: Reduce nitrates and pesticides subject to transport through leaching; reduce wind erosion.

IMPACTS:

- Adoption of nutrient management plans resulted in reduced nitrogen (NO_3-N) application of 133 lbs on 4,456.1 acres for a total of 592,661 lbs; and reduced phosphorus (P_2O_5) application of 25.8 lbs on 2,217.7 acres for a total of 57,217 lbs.
- Used oil collection day was held with over 7,200 gallons of used oil was collected for recycling.
- Implementation of Integrated Pest Management (IPM) program has reduced pesticide use as follows in 1993: atrazine 0.5 lb a.i, naptalam 1.0 lb a.i, paraqual 0.5 lb a.i. (a.i. - active ingredient)

ACTIVITIES:

- Produced videos, brochures, press releases, radio spots to promote project goals.
  Secured a wellhead protection survey to meet the needs of Mason county residents.
- Published newsletters and news releases to promote water quality.
- A wellhead survey of the Havana and Quiver townships was conducted.
- Information on irrigation water management and irrigation scheduling continues to be distributed via tours.
- Installed check valves on irrigation systems thus having the potential to reduce or prevent back-flow of agrichemicals into the aquifer.
- Groundwater field day was held to showcase major causes of groundwater pollution.
- Developed IPM plans on 1216 acres of irrigated cropland.
- To date, 334 individuals have received training on IPM program issues, 1902 individuals have participated in project field days.
- Fencing of livestock has improved grazing management on 1736 acres.

OTHER AGENCIES: Illinois Geological Survey, and the U.S. Fish and Wildlife Service.

REPORTING & EVALUATION: The microcomputer irrigation schedule program will be used to help farmers schedule irrigation; computer models will be used to track the fate of pesticides and nutrients.

STATE: ILLINOIS **PROJECT SIZE:** 122,240 acres.
PROJECT NAME: LITTLE VERMILION **STARTED:** 1991
COUNTIES IN PROJECT: CHAMPAIGN, EDGAR, VERMILION

CROPS/LIVESTOCK: Corn, soybeans, pasture, hay and small grains.

OBJECTIVES: Reduce contamination of surface water; improve aquatic fish and wildlife habitat, reduce impacts of nutrients and pesticides.

IMPACTS:

- Adoption of Best Management Practices (BMPs) in implementing nutrient management plans resulted in reduced nitrogen (NO_3-N) application of 15 lbs/ac over 9,829 acres for a total of 147,435 pounds.
- Implementation of sediment control practices resulted in reduced sediment yield of 70,340 tons.

ACTIVITIES:

- Held tours demonstrations and workshops to promote project goals.
- Developed brochures, factsheets, video, and newsletters to promote water quality.
- Produced a video that outlines water quality features and the benefits of grass filter strips.
- To date, nutrient management plans have been installed on 8,829 acres and on pest management plans were installed on 2,552 acres.
- For effective application of erosion control practices, conservation tillage practices have been applied on 15,000 acres.

OTHER AGENCIES: Illinois Geological Survey, Environmental Protection Agency, Illinois Department of Conservation.

REPORTING & EVALUATION: Recordkeeping, data collection; sample private wells, monitor well water quality.

STATE: INDIANA **PROJECT SIZE:** 209,000 acres.
PROJECT NAME: UPPER TIPPECANOE **STARTED:** 1990
COUNTIES IN PROJECT: KOSCIUSKO, WHITLEY, NOBLE
CROPS/LIVESTOCK: Corn, soybeans, wheat, hay; poultry, hogs, dairy, and beef cattle.
OBJECTIVES: Reduce pesticide and nitrate loading to ground water resources; reduce phosphorous loading and sedimentation of surface waters.

IMPACTS:

- Implementation of erosion control practices resulted in 43,000 tons of soil being saved and 430 pounds of soluble phosphorus being prevented from entering surface waters.
- Pesticide use over the last four years has resulted in 10 to 30 percent reduction in Atrazine use and 25 to 50 percent reduction in Alachlor use.
- Integrated crop management strategies adopted by producers resulted in reduced corn rootworm insecticide use by 300 pounds of active ingredient.
- Two livestock producers who used the Presidedness nitrate testing reduced nitrogen application by a total of 6,335 pounds of N on 65 acres (97 lbs/acre).
  One of the producers saved $5.00 per acre of a 20 acre test area.
- Adoption of waste utilization by 2 dairies , 1 duck, 3 swine and 1 beef operation resulted in an estimated 60,000 tons of manure being efficiently utilized rather than entering streams. The nutrient equivalents managed are roughly 825,890 pounds of total nitrogen and 681,952 pounds of phosphate.
- A random sample of 100 fields in the project shows an average soli savings of 8.5 tons/acre/year.
- A more effective use or application of nitrogen with practices for hayland and pasture management resulted in reduced nitrogen application rates by an average of 21 lbs/acre over 10,815 acres, with a total reduction of 227,115 pounds of nitrogen ($N0_3$-N) applied.
- The application of phosphorus resulted in an average reduction in application rates by 30 lbs/acre over 4,507 acres for a total reduction of 135,210 pounds of phosphorus (P_20_5) applied.

ACTIVITIES

- Published newsletters, brochures, and factsheets to promote water quality.
- Held hazardous pesticide disposal days.
- The State T by 2000 Soil Conservation Education program has been valuable in promoting project goals in the watershed.
- The following erosion and sediment control practices have been implemented to date: 28,464 acres of conservation tillage, 12,519 acres of conservation cropping sequence, and 5,306 acres of conservation cover.
- Manure management strategies were discussed at 3 workshops attended by 100 farmers.
- Conducted field days, workshops, on-one-one contacts to promote project goals.
- Increased pest scouting has replaced the routine application of insecticides.

INDIANA **UPPER TIPPECANOE**

OTHER AGENCIES: County Health Departments, Indiana Department of Environmental Management, U.S. Fish and Wildlife Service.

REPORTING & EVALUATION: Private well sampling for nitrates, use of simulation models: Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), Erosion Productivity Impact Calculator (EPIC) and Agricultural Nonpoint Source Pollution Model (AGNPS) for surface water sampling for sediment and phosphorus; Farm*A*Syst used for potential groundwater contamination.

STATE: INDIANA **PROJECT SIZE:** 249,000 acres.
PROJECT NAME: TRI-COUNTY **STARTED:** 1991
COUNTIES IN PROJECT: LA PORTE, MARSHALL, ST.JOSEPH
CROPS/LIVESTOCK: Corn, soybeans, hay, wheat, turf, blueberries, onions, mint, cabbage, cucumbers, tomatoes; hogs, and dairy.
OBJECTIVES: Reduce nitrates and pesticides in surface and ground water; reduce phosphates and sediment loading in surface waters.

IMPACTS:

- A pesticide disposal day held by 33 farmers resulted in 2,440 pounds of unwanted can disposals.
- Four farmers who used the presidedress nitrate test on 470 acres reduced nitrogen ($N0_3$-N) applications by a total of 18,775 pounds and saved approximately a total of $2,250 in fertilized costs.
- Adoption of Best Management Practices (BMPs) for effective use of nitrogen resulted in reduced nitrogen ($N0_3$-N) application of 29 lbs/acre over 23,721 acres for a total of 687,909 pounds reduced. This is a savings of $83,403.
- Efficient application of phosphorus in the implementation of BMPs resulted in reduced phosphorus (P_20_5) application of 9 lbs/acre over 23,251 acres for a total of 209,259 pounds reduced. This is a savings of $42,968.
- Conservation tillage (residues greater than 30 percent) use was estimated at over 35 percent on soybeans and 21 percent on corn impacting nearly 31,800 acres.

ACTIVITIES:

- Published brochures, newsletters and fact sheets to promote water quality.
- Conducted meetings, field days, demonstrations, surveys, one-on-one sessions to promote project goals.
- On-farm testing of ammonia-nitrogen in manure was conducted.
- Developed and distributed worksheets to calibrate manure spreader.
- Established Integrated Pest Management demonstrations to teach crop scouting and evaluate pest control alternatives.
- Held well water testing programs with 119 participants attending.
- Promoted conservation planning and cost share programs to increase producer participation.
- Installed pesticide management plan on 8,933 acres to date, and waste utilization on 1,146 acres.

OTHER AGENCIES: County Health Departments, Indiana Department of Environmental Management; Indiana Department of Natural Resources.

REPORTING & EVALUATION: Collect land treatment data; private well testing; the following computer models will be used to evaluate the impact of implementation: Agricultural Non-Point Source (AGNPS), Erosion Productivity Impact Calculator (EPIC), and Groundwater Loading Effects of Agricultural Management Systems (GLEAMS).

STATE: IOWA **PROJECT SIZE:** 13,300 acres.
PROJECT NAME: UNION GROVE & BLACK HAWK **STARTED:** 1990
COUNTIES IN PROJECT: TAMA, MARSHALL (UNION GROVE LAKE); SAC & CARROLL (BLACK HAWK LAKE)
CROPS/LIVESTOCK: Corn, potatoes, soybeans, alfalfa, oats; feeder cattle, and hogs.
OBJECTIVES: Voluntary adoption of refined crop and manure management to reduce sediment and animal waste delivery; improve protection of private water wells.

IMPACTS:

- Adoption of no-till practice resulted in decreasing soil loss from 10 tons per acre to 5 tons per acre on 700 acres for a total of 3,500 tons reduction in sediment yield.
- Effective nutrient management plans for nitrogen on 300 acres saved one farmer a total of $2,880.
- Adoption of nutrient management practices resulted in reduced nitrogen (NO_3-N) application of 30 tons and reduced phosphorus (P_2O_5) application of 72 tons over 5,059 acres.
- Integrated Pest Management strategies adopted by several producers have resulted in reduced fonofos (pesticide) application of 0.32 lb active ingredient over 5,059 acres for a total of 1,618 pounds of active ingredient reduced.
- Implementation of conservation practices reduced potential soil erosion by 31,325 tons annually compared to erosion rates before 1990.
- Recreational use of the lake has increased nearly 25 percent since 1989.
- Adoption of Best Management Practices for nutrients resulted in reduced nitrogen application by an average of 102,270 pounds over 2,922 acres; and decreased phosphorus application by 1,534 pounds over 2,922 acres annually.
- Implementation of conservation practices such as conservation tillage and conservation cropping systems, grassed waterways, water and sediment control basins, and grade stabilization resulted in reduced sediment load into the lake by 9,300 tons annually.
- Sheet and rill erosion fell from an average of 9 tons per acre per year in 1990 to 3 tons per acre per year in 1993 and gully erosion dropped from 4,500 to 160 tons annually in that time.
- Integrated Crop Management (ICM) strategies adopted by ICM scouts save on cooperator $1,200 on insectide costs.
- By using ICM, farmers have increased their profitability by $15.79 per acre annually while reducing potential runoff of nutrients and pesticides.

IOWA **UNION GROVE**

ACTIVITIES:

- Developed a well closing project (12 closed to date).
- Conducted crop scouting, soil testing, demonstrations, and field days to promote project goals.
- Over 450 students were actively involved in groundwater demonstration program.
- To date, 38 wells have been tested.
- Produced radio programs, newsletters, factsheets and brochures to promote water quality.
- Conducted meetings, tours, and one-on-one contacts to promote practices which improve and protect water quality.
- Producers since 1990 have installed 100,000 feet of terraces, 160 acres of grassed waterways, 30 water and sediment control basins, and 80,000 feet of field boarders.
- Project staff worked one-on-one with cooperators and did intensive soil sampling to develop nutrient management plans for producers on 12,080 acres.

OTHER AGENCIES: Iowa Department of Natural Resources, Environmental Protection Agency, Iowa Department of Agriculture, and Land Stewardship.

REPORTING & EVALUATION: Lake water monitoring for phosphorus, turbidity, chlorophyll, fecal coliforms and temperature; surveys of farmer practices and attitudes toward water quality concerns; Planetor and Camps will be evaluated.

STATE: IOWA **PROJECT SIZE:** 22,780 acres.
PROJECT NAME: SNY MAGILL **STARTED:** 1991
COUNTIES IN PROJECT: CLAYTON
CROPS/LIVESTOCK: Corn, oats, alfalfa, soybeans, pasture.
OBJECTIVES: Voluntary adoption of improved crop and manure management to reduce sediment and animal waste delivery to a coldwater stream; improved protection of private water wells.

IMPACTS:

- Integrated Pest Management strategies adopted by several producers resulted in the reduction of 1,879 pounds of active ingredients each, in the use of organophosphate, fonfos, chlorpyrifos, turbos on 1,160 acres; and also reduced atrazine usage by 1,535 pounds of active ingredient on 4,385 acres.
- Implementation of nutrient management plans saved producers $2,156 on 280 acres, reduced N (NO_3-N) application by 7,104 lbs and P (P_2O_5) application by 7,280 lbs.
- Implementation of nitrogen management practices by 5 producers resulted in reduced nitrogen (NO_3-N) application by 27,875 lbs on 694 acres or about 40 lbs. per acre.
- Best Management Practices adopted for nutrient applications resulted in reduced nitrogen ($N0_3$-N) application of 78,105 pounds in the watershed; and reduced phosphorus application by 17,999 pounds in the watershed.
- More than 85 percent of the project acres have been voluntarily enrolled by watershed landowners and farmers into farming practices to improve and protect water quality.
- Adoption of Integrated Crop Management plans have resulted in nitrogen use being reduced by 32 lbs. per acre saving $4.60 per acre on acres that practices were implemented on. Adopting these management practices saved producers $5,930.

ACTIVITIES:

- Conducted meetings, tours, field days and on-farm demonstrations to promote practices which improve and protect water quality. Targeted practices include tillage and crop nutrient management, manure & pasture management.
- Published newsletters, brochures, news releases, news articles and reports to promote project goals.
- Provided individualized integrated crop management assistance to farm operators' crop and pasture acres for soil testing and nutrient management planning, regular scouting and pest management planning, crop enterprise record keeping.
- Conducted meetings, tours, field days and on-farm demonstrations, to promote water quality.
- To date, nutrient management plans have been implemented on 3,428 acres for nitrogen and phosphorus practices.
- Erosion and sediment control practices have been implemented on 772 acres of conservation tillage, 25,200 feet of field borders, and 167,700 feet of terraces.

IOWA **SNY MAGILL**

OTHER AGENCIES: Iowa Department of Natural Resources, Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Forest Service, U.S. National Park Service.

REPORTING & EVALUATION: Monthly and quarterly reports to all cooperating agencies, crop enterprise records kept, survey of farmer practices, conducting long term intensive monitoring project.

STATE: IOWA
PROJECT NAME: THREE MILE CREEK
COUNTIES IN PROJECT: ADAIR, UNION

PROJECT SIZE: 23,300 acres.
STARTED: 1991

CROPS/LIVESTOCK: Corn, alfalfa, soybeans, pasture; and beef cattle.

OBJECTIVES: Voluntary adoption of refined crop and manure management and other best management practices to control erosion, sediment runoff, and animal waste delivery to the planned Three Mile Lake.

IMPACTS:

- Implementation of Integrated Pest Management practices resulted in reduced insecticide use of 93 lbs. of active ingredient on 85 acres of corn, and an economic gain of $1,041.
- Adoption of field scouting practices resulted in reduced pesticide use saving 7 farmers $5,160 on 516 acres.
- Integrated crop management strategies adopted in a 300 acre farm, produced an estimated yield increase of 20 bushels per acre with an increase in profit total of $8,100.
- Adoption of Best Management Practices for nutrients resulted in reduced Nitrogen ($N0_3$-N) application of 33,737 lbs. over 3,070 acres, and reduced Phosphorus application of 15,908 lbs. over 3,495 acres.
- Additional savings and pesticide reductions can be attributed to integrated crop management strategies which resulted in excellent weed control and decreased the amount of a pesticide used by 44 lbs. of active ingredient on a 10-acre field.

ACTIVITIES:

- One-on-one contacts were made with 131 watershed landowners and operators.
- Conducted meetings, tours, field days and on-farm demonstrations to promote practices which improve and protect water quality.
- Provide individualized integrated crop management assistance and nutrient management planning, regular scouting and pest management planning, crop enterprise record keeping.
- News releases published in area newspapers regarding water quality reaches a circulation of approximately 10,000 subscriptions.
- In FY 94, approximately 3,430 people were contacted through presentations and booths to increase awareness of the pollution prevention project, and the use of Best Management Practices.
- To date, nutrient management plans have been implemented on 3,070 acres for nitrogen application and 3,495 acres for phosphorus application.
- To date, pest management plans have been implemented on 5,070 acres.

IOWA **THREE MILE CREEK**

- Best Management Practices implemented to date on erosion/sediment control practices include: 7,828 acres of conservation cropping sequence, 7,697 acres of conservation tillage, 40,371 feet of terraces.

OTHER AGENCIES: Iowa Department of Agriculture and Land Stewardship Iowa Department of Natural Resources, Environmental Protection Agency, Three Mile Reservoir Agency.

REPORTING & EVALUATION: Monthly and quarterly reports to all cooperating agencies; crop enterprise records kept by integrated crop management program cooperators; sociological surveys of farmer practices and attitudes toward water quality concerns; determination of leaching potential of soils and chemicals used; long term intensive monitoring project sponsored by Environmental Protection Agency, demonstration and a watershed water quality planning tool (models) evaluation.

STATE: KANSAS
PROJECT NAME: WEBSTER CREEK
COUNTIES IN PROJECT: BROWN, NEMAHA

PROJECT SIZE: 7,040 acres.
STARTED: 1991

CROPS/LIVESTOCK: milo, wheat, soybeans, corn, alfalfa, sorghum and red clover.

OBJECTIVES: Reduce suspended solids and phosphorus; reduce nitrates, fecal bacteria, pesticides, and organic waste.

IMPACTS:

- Developed nutrient management plans for producers on 500 acres. This resulted in reduced nitrogen (NO_3-N) application of 8 lbs/ac for a reduction of 4,000 lbs.
- Soil testing of phosphorus on 600 acres resulted in P_2O_5 reduced at 24 lbs/acre for a total of 14,400 pounds.
- Adoption of pesticide management practices by producers has resulted in reduced potential atrazine runoff by 38% in corn and 50% in grain sorghum.
- Reduced nitrogen (NO_3-N) loss from the edge of the field by 4.5% on 1,234 acres.
- Reduced phosphorus (P_2O_5) loss from the edge of field by 29% on 1,530 acres.

ACTIVITIES:

- Held public meetings, field days, tours, demonstrations; published newsletters, newspaper articles, to promote water quality goals and pollution control practices in the watershed.
- Adapted and pilot tested Farmstead Assessment System (Farm*A*Syst).
- Developed water quality monitoring and assessment plans.
- Implemented abandoned well plugging.
- To date nutrient management plans have been implemented on 1,520 acres, installed 26 well water testing on 4 farmsteads.

OTHER AGENCIES: Kansas Department of Health and Environment, Nemaha County and Brown County Conservation Districts.

REPORTING & EVALUATION: Water sampling; watershed monitoring and soil monitoring of nitrate-nitrogen, phosphate, fecal coliform bacteria, atrazine, alachlor anticipated; Agricultural Nonpoint Source (AGNPS) model will be used to evaluate pollution control practices.

STATE: KENTUCKY **PROJECT SIZE:** 224,214 acres
PROJECT NAME: TAYLORSVILLE LAKE **STARTED:** 1991
COUNTIES IN PROJECT: ANDERSON, BOYLE, MERCER, NELSON, SHELBY,
CROPS/LIVESTOCK: Corn, wheat, soybeans, tobacco; dairy, and beef cattle.

OBJECTIVES: Reduce sediment, organic materials, bacteria, pesticide residues, soil erosion, and nutrient loading. Inform and educate landusers and the public in the watershed of problems associated with nonpoint source pollution.

IMPACTS:

- Increased grower awareness of reducing the impact of nutrients and pesticides application within the project.
- Increased public awareness of reducing non-point source pollution.
- Circulated 9 newsletters to 2,548 farmers.

ACTIVITIES:

- Constructed animal waste facility with a wet cell component for waste water treatment.
- Developed newsletters and newspaper articles; conducted tours, field days, well testing, soil testing to promote project goals.
- Promoted cost share programs and conservation planning to increase producer adoption.
- Developed water quality display for use in meetings and conferences to promote water quality in the watershed.
- Established volunteer monitoring groups, hosted field days and demonstration.
- Encouraged farmers to install animal waste facilities for dairy, swine and beef cattle to reduce nutrient loading.
- Encouraged farmers to install grassed waterways, establish pasture and hayland seedings and develop streambank protection to reduce soil erosion.
- Installation of animal waste holding facilities increased from 8 in 1992 to 12 in 1993.
- Installed 2500 feet of pipeline and 6 livestock watering tanks; 4552 feet of streambank stabilization and 1200 feet of diversions.

OTHER AGENCIES: Corps of Engineers, Kentucky Department of Fish & Wildlife, Kentucky Division of Water and Conservation, Kentucky Geological Survey, U.S. Environmental Protection Agency, and the U.S. Geological Survey.

REPORTING & EVALUATION: Water monitoring; baseline data collected; evaluate fish population; evaluate and monitor Best Management Practices.

STATE: LOUISIANA **PROJECT SIZE:** 195,000 acres.
PROJECT NAME: BAYOU QUEUE DE TORTUE **STARTED:** 1990
COUNTIES IN PROJECT: ACADIA, VERMILION, LAFAYETTE
CROPS/LIVESTOCK: Irrigated rice, soybeans, wheat, and crawfish.
OBJECTIVES: Reduce sediment discharges from rice fields.

IMPACTS:

- Adoption of erosion control practices has reduced erosion yield by 79,363 tons over 44,091 acres.
- Adoption of sediment control practices has reduced sediment yield by 67,459 tons over 44,091 acres.
- Implementation of erosion and sediment control practices has resulted in 73% of project goals for water quality practices being met.
- Approximately 85% of the rice farmers in the project selected the weed control program in 1993.

ACTIVITIES:

- Rice field days were used to develop interest; 1000 participants attended field days in 1993.
- Conducted radio and television programs.
- Published newsletters, brochures and factsheets to promote project goals.
- Promoted conservation planning and cost share programs.
- Implemented long term agreements with producers.
- In 1993, 282 referrals were made which resulted in 24,007 acres of riceland water quality Improvement Practice and 73 structures for water control.
- Farm*A*Syst is being developed for this project.
- To date, implementation of Erosion control BMPs has resulted in the following installations: 41,095 acres of irrigation timing and duration, 749 acres of conservation tillage, 7,288 acres of irrigation water management and 2,996 acres of rice water holding period.
- Developed a water quality video for the watershed.

OTHER AGENCIES: Louisiana Department of Environmental Quality, and the U.S. Geological Survey.

REPORTING & EVALUATION: Prepare a Geographic Information System (GIS) to develop a sampling plan.

STATE: MAINE **PROJECT SIZE:** 96,808 acres
PROJECT NAME: LONG/CROSS LAKES **STARTED:** 1990
COUNTIES IN PROJECT: AROOSTOOK
CROPS/LIVESTOCK: Potatoes, oats; beef cattle, and horses.
OBJECTIVES: Reduce total phosphorus and silt loads, restore tributary streams, encourage adoption of integrated pest management practices to minimize the use of unnecessary pesticide applications, and maintain rural private water supplies while maintaining farm viability.

IMPACTS:

- Adoption of the liquid fertilizer use by five growers resulted in 8000 pounds of nitrogen being utilized on over 800 acres for a cost savings of $2,000.
- To date, implementation of BMPs has resulted in reductions of 88,270 lbs of nitrogen (NO_3-N), and 110,922 lbs of phosphorus (P_2O_5), being utilized rather than entering streams.
- Integrated pest management strategies adopted by several producers have reduced pesticide use in FY 93 as follows: Mancozeb 1.7 lbs a.i. on 6150 acres for a total of 10,455 lbs Esfenvalerate 0.0495 lb a.i. on 4950 acres for a total of 245 lbs.
- Adoption of nutrient and sediment control structures have resulted in a reduction of 798 tons of sediment from leaving the edge of the field.
- Consultations made with 17 producers has resulted in reduced nitrogen application by an average of 28.7 lbs/ac over 1,100 acres for a total of 31,570 pounds.
- By not adding commercial fertilizers, applications have been reduced by 120 lbs/ac for nitrogen (NO_3-N), 160 lbs/ac for P (P_2O_5), and 160 lbs/ac for K (K_2O); on over 120 acres of cropland.
- Growers reduced fungicide materials sprayed in the watershed by an estimated 1.5 lbs/ac on 3600 acres for a total of 5400 lbs.

ACTIVITIES:

- Conducted meetings, tours, to promote irrigation, pesticide, and nutrient management.
- Published newsletters and made one-on-one contacts to promote project goals.
- Implemented long term agreements with producers.
- Farm*A*Syst is being adapted in the watershed.
- Installation of nutrient and sediment control structures could reduce sediment load to the watershed by an estimated 700 tons.
- 71% of the planned BMPs on nutrient and pesticide management have been implemented to date.
- 77% of the planned BMPs on sediment and erosion control practices have been implemented to date.

OTHER AGENCIES: Maine Department of Environmental Protection, Maine Department of Inland Fisheries and Wildlife, USDA-Agricultural Research Service, Family Farm Core.

REPORTING & EVALUATION: Monitoring of P by sampling on Dickey Brook; watershed survey to locate P sources; inventory of agricultural land; monitoring of household water supplies.

STATE: MARYLAND **PROJECT SIZE:** 12,079 acres.
PROJECT NAME: GERMAN BRANCH **STARTED:** 1991
COUNTIES IN PROJECT: QUEEN ANNE'S
CROPS/LIVESTOCK: Corn, wheat, soybeans, barley, alfalfa, vegetables; beef cattle.
OBJECTIVES: Reduce nitrate and phosphorus levels; improve wildlife and fish habitat, emphasize integrated crop management.

IMPACTS:

- Implementation of agronomic and erosion/sediment control practices resulted in 15,841 tons of soil being reduced on over 9,331 acres of cropland.
- Adoption of Best Management Practices for nutrients resulted in reduced nitrogen ($N0_3$-N) application of 250,700 pounds on 10,028 acres, reduced phosphorus (P_20_5) application of 168,587 pounds of 8,873 acres.
- Integrated Pest Management practices adopted on 14,279 acres of cropland reduced herbicide application rate by 5 percent.

ACTIVITIES:

- Animal waste and municipal sludge are being more effectively utilized as a result of waste management plans, soil testing, and waste sampling.
- Developed brochures, newsletters to promote water quality in the watershed.
- Conducted field days, tours and demonstrations to promote water quality.
- Implemented field scouting of pests for 23 producers on 6,285 acres of corn, wheat, soybeans, barley, and alfalfa.
- Completed 8 animal waste systems and 17 waste storage structures.
- Implemented nutrient management plans on 7,290 acres of cropland on 45 farms.
- Nutrient management planning and animal waste management efforts resulted in the completion of 8 animal waste systems and 17 waste storage structures.
- To date, 10 animal waste storage facilities and 7 dead poultry composting facilities have been constructed to improve animal waste application.
- Pre-sideness Nitrogen Testing (PSNT), commonly called the nitrate "quick test" was conducted 56 times for 10 farmers on 1,210 acres in the watershed.

OTHER AGENCIES: Maryland Department of Agriculture, Maryland Department of Natural Resources and Environment; Queen Anne's Soil Conservation District.

REPORTING & EVALUATION: Monitoring export of nutrients; computer modeling; record keeping; living resource monitoring; surface and groundwater sampling; economic data collection.

STATE: MASSACHUSETTS **PROJECT SIZE:** 69,000 acres.
PROJECT NAME: WACHUSETTS RESERVOIR **STARTED:** 1991
COUNTIES IN PROJECT: WORCESTER
CROPS/LIVESTOCK: Silage corn, hay, sweet corn, tomatoes, squash, nursery crops, dairy, beef, swine, sheep, and horses.
OBJECTIVES: Reduce nutrients, bacteria and toxic substances; develop best management system; reduce pesticide impacts.

IMPACTS:

- To date, adoption of nutrient management plans has resulted in reduced nitrogen (NO_3-N) application of 216,880 lbs on 2,360 acres and 145,600 pounds of phosphorus (P_2O_5) on 1,456 acres.
- Approximately 9,294 tons of dairy manure per year was effectively utilized on 1,341 acres of cropland as a result of producer adoption of waste utilization.

ACTIVITIES

- Created watershed task force of local officials and organizations to promote dialogue and serve as forum for discussion of water quality issues.
- Developed turf and landscape Integrated Pest Management (IPM) standards and provided on going training to landscape industry.
- Developed nutrient and pesticide management plans for six farms within the watershed.
- A hazardous waste collection day was conducted in one town.
- Conducted meetings and field days to promote project goals.
- Held demonstration on erosion control.
- Utilized National Pesticide Database and User decision support system for Risk Assessment of Ground and surface water contamination (NPURG) computer program with silage production.
- Held a sustainable crop production tour.
- Produced fact sheets, brochures and newsletters to promote project goals.

OTHER AGENCIES: Land Use Planner, Metropolitan District Commission, EPA, MA. Highway Department, Department of Food and Agriculture.

REPORTING & EVALUATION: Evaluate nutrient management; use the following computer models: Chemical Runoff and Erosion from Agricultural Management Systems (CREAMS), Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), National Pesticide Database and User decision Support System for Risk Assessment of Ground and Surface Water Contamination (NPURG).

STATE: MASSACHUSETTS **PROJECT SIZE:** 240,000 acres.
PROJECT NAME: BUZZARDS BAY **STARTED:** 1990
COUNTIES IN PROJECT: PLYMOUTH, BRISTOL, BARNSTABLE
CROPS/LIVESTOCK: Cranberries, sweet corn, vegetables, orchards, hay, silage corn; dairy
OBJECTIVES: Reduce pesticide and nutrient loadings, reduce pollution from storm water runoff; manage nutrient application.

IMPACTS:

- Three vegetable producers utilized hairy vetch as a nitrogen fixing cover crop on 60 acres of land; average nitrogen applications were reduced an average of 60 lbs/acres based on soil tests with no reduction in yields
- Approximately 90 persons attended two workshops on water quality and hazardous household products; evaluation showed that 85% of the attendees subsequently decided not to purchase one or more products considered unsafe for the environment; and 74% purchased one or more safer alternatives to hazardous products
- Roughly 70% of crop hay acres needing water quality practices for erosion/sediment control have been implemented

ACTIVITIES:

- Ground penetrating radar is used to evaluate sites for tailwater recovery and ponds.
- Distributed factsheets on underground storage tanks and household hazardous waste management.
- Developed a vegetable Integrated Pest Management (IPM) program to include cover crops, scouting, pesticide recommendations, potato and cranberry manuals.
- Implemented nutrient management plans for 11 dairies on 1,286 acres with 1,100 animal units; conducted tissue analysis on over 2,000 acres.
- Developed water education training curriculum which has trained 300 teachers in 13 communities; 1,775 children utilized the curriculum.
- Conducted numerous workshops for over 500 local officials on bufferstrips, stormwater management and conservation practices related to water quality.
- Implemented long term agreements with producers; plans for water management on cranberry bogs were developed.
- Distributed 2,000 septic system packets to homeowners.
- Conducted field days and demonstrations to promote water quality.
- Developed factsheets and newsletters to promote project goals.
- Held in-service training on soils/pesticide database.

OTHER AGENCIES: Buzzards Bay National Estuary Project Committe, and the Coastal Zone Management Board, Massachusetts Division of Energy, Marine Fisheries, Fish and Wildlife Services, Committee of Environmental Protection.

REPORTING & EVALUATION: Tracking reduced inputs of agricultural chemicals and pollutants, on-site monitoring of coliform, hydrocarbons; monitor drinking water supply.

STATE: MICHIGAN **PROJECT SIZE:** 67,740 acres.
PROJECT NAME: SYCAMORE CREEK **STARTED:** 1990
COUNTIES IN PROJECT: INGHAM
CROPS/LIVESTOCK: Corn, alfalfa, soybeans, wheat, oats; dairy, beef cattle, and swine.
OBJECTIVES: Promote adoption of Best Management Practices (BMPs) for farmers and homeowners; reduce sedimentation; reduce level of non-point source pollutants from agricultural and urban areas.

IMPACTS:

- Adoption of reduced tillage systems on 9889 acres of cropland reduced soil erosion by 7 tons per acre per year resulting in a reduction of 69,223 tons of sediment from leaving the edge-of-field.
- Adoption of BMPs has resulted in nitrogen and phosphorus fertilizer use being reduced by 30 lbs and 20 lbs/acre respectively.
- Integrated crop management strategies adopted by some farmers have reduced the use of atrazine from 3 quarts/acre to one quart or less per acre.

ACTIVITIES:

- Implemented ICM on 4,683 acres of corn, alfalfa, soybeans and wheat.
- Conducted monitoring of suspended solids using the paired watershed approach.
- Published news releases, magazines, newsletter articles, brochures, television and radio spots to promote project goals.
- Established demonstration plots concerning spring nitrate testing, phosphorus reduction, cover crops, banded herbicide applications, and soil insecticide reductions.
- Sponsored well water testing clinic for nitrates to determine baseline data.
- Using supplemental funds to conduct monitoring in Sycamore Creek for coliform bacteria at three sites.
- Conducted cover crop, intensive rotational grazing, community supported agriculture, community garden pest and nutrient management, and environmentally friendly gardening workshops.
- Conducted storm drain stenciling projects in concert with 4-H Youth programs.
- More and more farmers are using deep nitrate testing to reduce fertilizer application on corn.

OTHER AGENCIES:
Ingham County Health Department, Michigan Department of Agriculture, and Michigan Department of Natural Resources.

REPORTING & EVALUATION: Quantified fertilizer and pesticide reductions and behavioral and attitude changes; remote sensing to locate gully erosion, measure cropland residue cover, sample all storm flow.

STATE: MICHIGAN **PROJECT SIZE:** 48,000 acres.
PROJECT NAME: WOLF CREEK **STARTED:** 1991
COUNTIES IN PROJECT: LENAWEE
CROPS/LIVESTOCK: Corn, soybeans, wheat, oats, hay; dairy, and beef cattle.
OBJECTIVES: Reduce chemical loading and amount of sediment and phosphorus entering Lake Adrian, implement and evaluate Best Management Practices (BMPs), and expand the water quality database through rural well testing.

IMPACTS:

- Adoption of sediment control practices by producers resulted in reduced sediment yield of 6,380 tons on 1,450 acres.
- Nutrient reduction practices on 380 acres resulted in 251 lbs. reduced Nitrogen (NO_3-N) application and 32 lbs phosphorus (P_2O_5) application on 1,650 acres for a total reduction of 95,631 pounds and 52,800 pounds respectively.

ACTIVITIES:

- Three radio programs reached 292,000 people.
- Thirteen news articles have been published on water quality and Integrated Pest Management reaching 22,000 people.
- Conducted tours, meetings, demonstrations and field days to promote project goals.
- To date, 7,971 acres of conservation tillage, 10 erosion control structures, and 4,357 acres of conservation cover have been installed.
- A pesticide containment facility has been constructed.
- Conducted IPM training for producers.
- Over 400 farmers attended a tillage field day on conservation practices.

OTHER AGENCIES: U.S. Geological Survey, City of Adrian, and Lenawee County Health Department, Michigan Department of Agriculture.

REPORTING & EVALUATION: Evaluation of BMPs; assisting homeowners to better understand the content and quality of their drinking water; implementation of ASCS programs; implementation of an IPM Program.

STATE: MINNESOTA **PROJECT SIZE:** 145,920 acres.
PROJECT NAME: ST.PETER/PRAIRIE DU CHIEN **STARTED:** 1990
COUNTIES IN PROJECT: OLMSTED
CROPS/LIVESTOCK: Corn, soybeans, peas, hay, small grains; dairy, beef, and swine.
OBJECTIVES: Reduce the amount of erosion; improve drinking water quality by reducing nitrate contamination.

IMPACTS:

- Adoption of conservation practices resulted in reduced soil erosion by 74,400 tons/year on 10,057 acres.
- Reduced nitrogen (NO_3-N) application by 71.3 lbs per acre per year on 1470 acres (104,811 total pounds reduced)
- Reduced phosphorus (P_2O_5) application by 21.8 lbs per acre per year on 1470 acres (32,046 total pounds reduced).
- The average reduction of pesticide application in pounds of active ingredient applied per acre per year relative to baseline use is as follows: (Pesticide trade name) Dual 0.9, , Bladex 0.19, Atrazine 1.2, Banvel (pt) 0.25, Lasso (qt) 0.76, Thiment 0.99, Lorsban 0.51, Marksman (pt) 0.89.

ACTIVITIES:

- Educational activities included field days, demonstration plots, direct mailings.
- Published factsheets, newsletters, brochures and news articles to promote water quality.
- Participated in local radio and television programs.
- Sixty-seven producers installed erosion sediment control practices on 3,492 acres.
- Installed two manure storage facilities.
- Implemented conservation practices to more than 300 landowners.
- Adopted Farmstead Assessment System (Farm*A*Syst) program with completion of 35 assessments.
- Installed 3,300 feet of tile outlet terraces; 2.4 acres of grassed waterways, 3457 acres of conservation tillage and 8630 acres of conservation cropping system.
- Pest management activities increased from 1500 to 6,000 acres in FY 93.
- BMPs resulting from nutrient management increased from 2000 to 8000 acres in 1993.

OTHER AGENCIES: City of Rochester, and Olmsted County Health Department.

REPORTING & EVALUATION: Evaluate impacts of land use planning, monitor wells for coliform bacteria, explore computer aids as means of estimating BMP's, examples are Nitrate Leaching and Economic Analysis Package (NLEAP), Sustaining and Managing Agricultural Resources for Tomorrow (SMART), Farm Financial Management Package (FINPAC), Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), PLANETOR, Manure Application Planner (MAP).

STATE: MISSISSIPPI **PROJECT SIZE:** 165,400 acres
PROJECT NAME: TANGIPAHOE RIVER **STARTED:** 1991
COUNTIES IN PROJECT: PIKE, AMITE, LINCOLN
CROPS/LIVESTOCK: Soybeans, corn, grain sorghum, wheat, ryegrass; and dairy.

OBJECTIVES: Reduce nutrients, organic matter, bacteria, and sediment loading, increase landowner knowledge of the impacts of agricultural activities on water quality; encourage adoption of Best Management Practices (BMPs).

IMPACTS:

- Terraces have reduced soil loss by 25%.
- Implementation of BMPs on conservation tillage resulted in 50% reduction in soil loss.

ACTIVITIES:

- Installed pasture and hayland practice on 647 acres.
- Conducted tours, radio spots, and field days to promote project goals.
- Completed 30% of goal on installing contour farm practices.
- Installed 11 animal waste treatment lagoons to date.
- Established well water testing program.
- Sampled 50 domestic wells.
- Conservation practices implemented include terracing, contours, pasture and hay management.
- Promoted conservation planning and cost share programs.
- Farmstead Assessment System (Farm*A*Syst)/Homestead Assessment System (Home*A*Syst) being adapted for field testing.
- Completed two waste management systems in FY 93.

OTHER AGENCIES: U.S. Geological Survey, Department of Environmental Quality.

REPORTING & EVALUATION: Procedures and guidelines in the Waste Management Field Manual will be used to determine load reductions; stream monitoring procedures have been developed; one major storm event was sampled; evaluate baseline data to determine water quality.

STATE: MISSOURI **PROJECT SIZE:** 457,000 acres.
PROJECT NAME: UPPER NIANGUA RIVER **STARTED:** 1991
COUNTIES IN PROJECT: CAMDEN, DALLAS, LACLEDE, WEBSTER

CROPS/LIVESTOCK: Soybeans, corn, wheat, sorghum; dairy, and beef cattle.

OBJECTIVES: Reduce excessive nutrients and pesticides.

IMPACTS:

- Reduction in contaminants leaving the bottom of the root zone or edge of the field with reductions in nutrient/pesticide rates of application are estimated to be 20%.
- Adoption of conservation practices primary for erosion control by serval producers has resulted in 25,335 tons of soil saved to date in the watershed.
- A more efficient and effective utilization of animal waste associated with new facilities over 47,000 acres, has resulted in a savings of 55,050 pounds of nitrogen (NO_3-N), 9,851 pounds of phosphorus (P_2O_5), and 36,700 pounds of Potassium K_20, available for growing crops instead of entering streams.
- The value of these saved nutrients is an estimated $18,000. Enough fertility to produce 1,300 tons of hay which has previously gone "down the river" annually.

ACTIVITIES:

- Farm*A*Syst program is being implemented through a series of public and producer workshops throughout the project area.
- Published newsletters, brochures, and fact sheets to promote water quality.
- Installed is animal waste facilities which will influence reductions in nutrient loadings.
- Conducted field demonstration for producers on merits of incorporating animal waste facilities in their overall management systems.
- Environmental short courses have been held.
- Adoption of the Farm*A*Syst program has resulted in the following accomplishments: 18 abandoned wells plugged, 80 private septic system consultations, 63 wells tested, 16 septic system upgrades.

OTHER AGENCIES: Missouri Department of Natural Resources, Missouri Department of Conservation, U.S. Geological Survey, Missouri Department of Health, and Mid America Dairymen.

REPORTING & EVALUATION: Well monitoring, Farm*A*Syst

STATE: MONTANA **PROJECT SIZE:** 8,960 acres.
PROJECT NAME: GODFREY CREEK **STARTED:** 1990
COUNTIES IN PROJECT: GALLATIN
CROPS/LIVESTOCK: Potatoes, hay, small grains, dairy, and beef cattle.

OBJECTIVES: Reduce suspended sediment, fecal coliform and nitrate loading.

IMPACTS:

- Erosion control practices have been implemented by 35 producers on 3,495 acres.
- Fifteen producers have implemented practices which will aid in sedimentation control on 243 acres.
- Seven producers have implemented positive changes in irrigation water management on 3,134 acres.
- Improvement in irrigation water management on 3,305 acres with an estimate of 25 to 30 percent improvement thereby reducing sediment and nutrient losses from fields.

ACTIVITIES:

- As part of the well water testing program efforts, six fences have been installed in the watershed to move stock off the creek.
- Published news articles, newsletters and brochures to promote project goals.
- Conducted tours, meetings, one-on-one contacts to promote water quality.
- Adopted the farm*A*Syst program in working with farmers.
- Implemented nutrient management plans on 1,613 acres, waste utilization on 618 acres and livestock exclusion on 77 acres.

OTHER AGENCIES: Montana Department of Natural Resources, Montana Water Quality Bureau, Montana Fish, Wildlife and Parks, and Environmental Protection Agency, County and State Department of Health and Environmental Sciences.

REPORTING & EVALUATION: Three impact stations will be sampled for water chemistry and aquatic biology; cowfish habitat capability model, photo-transect procedure, coldwater stream appraisal will be used in monitoring.

STATE: NEBRASKA **PROJECT SIZE:** 35,800 acres.
PROJECT NAME: ELM CREEK **STARTED:** 1990
COUNTIES IN PROJECT: WEBSTER
CROPS/LIVESTOCK: Irrigated wheat, corn, sorghum, and fish.
OBJECTIVES: Reduce sediment load; reduce irrigation runoff, pesticides, fertilizers and animal waste in runoff entering the creek.

IMPACTS:

- Adoption of Integrated Crop Management practice on 2,816 acres resulted in 35 lbs/acre reduction in nitrogen (NO_3-N) application for a total of 98,560 pounds reduced.
- Implementation of ICM practice on 2816 acres resulted in a reduction of 8.5 pounds per acre in phosphorus (P_2O_5) application for a total of 23,936 pounds reduced.
- To date, erosion control practices have resulted in an estimated sediment reduction of 28,417 tons.
- Adopting of erosion/sediment control practices resulted in classic gully sediment yield been reduced by 1991 tons, ephemeral gully erosion by 7445 tons, and sheet and rill sediment erosion by 18,981 tons.
- Application of pesticide control practices have resulted in reducer pesticide application as follows: cyanazine at 0.8 lb of active ingredient terbufos at 0.2 lb ai, and metolachlor at 0.2 lb ai.
- Irrigation efficiency has increased by 9%.

ACTIVITIES:

- Conducted workshops, meetings, tours and field days to promote project goals.
- News releases, radio and TV programs, factsheets, surveys have all been utilized to promote water quality.
- Fifteen 4-H members and 5 leaders donated 80 hours in planting over 370 trees.
- Twenty-eight cooperators implemented erosion control practices on 2,070 acres.
- Installed an automated weather station for the project.
- Within the last 12 months, 37 cooperators implemented erosion control practices on 6100 acres.
- BMPs have been applied on 2800 acres for nutrient management 2224 acres for irrigation management, and sediment reduction practices have been completed on 40 farms.

OTHER AGENCIES: Nebraska Department of Environmental Quality, the Nebraska Game and Parks Commission, Lower Republican Natural Resource District, and the Environmental Protection Agency.

REPORTING & EVALUATION: Water samples will be taken to monitor water temperature, total suspended solids, nitrates and fecal bacteria.

STATE: NEBRASKA **PROJECT SIZE:** 92,160 acres.
PROJECT NAME: CENTRAL BLUE VALLEY **STARTED:** 1991
COUNTIES IN PROJECT: GAGE, JEFFERSON, SALINE

CROPS/LIVESTOCK: Corn, soybeans, grain sorghum, wheat, alfalfa; beef, dairy, swine, sheep and poultry.

OBJECTIVES: Reduce nitrogen inputs; decrease water use and pesticide application.

IMPACTS:

- Implementation of Nutrient Management plans has resulted in total nitrogen (NO_3-N) saving of 112,353 pounds on 3,683.7 acres.
- Irrigation water practices reduced average use of irrigation water from 26.3 in/ac to 18.7 in/ac resulting in a savings of 7.6 in/ac (a savings of 2,249 ac ft/yr on 3,551 acres).
- Average irrigation efficiency increased from 47% to 66% due to effective irrigation water management.
- 92% of the 5-year project goal in nitrogen and phosphorus management for crop hay has been accomplished, 198% of the 5-year project goal in irrigation water management has been accomplished.

ACTIVITIES:

- Conducted water adventure days for 440 5th grade students.
- Handed out 517 water test kits.
- Twelve news articles and 11 radio programs were used to promote project activities.
- Conduct training for crop consultants.
- Currently revising the Farm*A*Syst program for adoption in Nebraska.
- Conducted field days, demonstrations, tours, meetings, mini-courses to promote water quality.
- To date, farmstead and wellhead practices have included 26 sealed wells 165 wells tested on 4 farmsteads, and 4 manure analysis conducted on 6 farmsteads.

OTHER AGENCIES: U.S. Geological Service, Nebraska Department of Environmental Quality.

REPORTING & EVALUATION: Testing of wells; evaluate reduced loading; monitor underground water level; monitor nutrient content; irrigation scheduling.

STATE: NEW HAMPSHIRE **PROJECT SIZE:** 503,200 acres.
PROJECT NAME: GREAT BAY **STARTED:** 1990
COUNTIES IN PROJECT: ROCKINGHAM, STRAFFORD
CROPS/LIVESTOCK: Orchards, corn, fruits, vegetables, dairy, beef, and sheep.
OBJECTIVES: Reduce soil erosion, provide cost sharing for pest management, reduce pollution from manures, nutrients, and pesticides.

IMPACTS:

- Adoption of management practices for effective application of nitrogen resulted in reduced nitrogen NO_3-N application of 4,450 pounds over 988 acres.
- In 1994, effective use of phosphorus (P_2O_5) application on 777 acres resulted in reduced phosphorus application of 18,648 pounds.

ACTIVITIES

- Publications, radio spots, newsletter items and direct communications with the public about water testing, well treatment, and septic systems reached over 500,000 people.
- To date, field nitrate nitrogen tests have been conducted benefitting 2,206 acres.
- Conducted tours, field days, demonstrations, workshops, one-on-one contacts to promote water quality.
- A program on water resources was presented to 100 middle school students in the HUA.
- Training for 41 teachers and 900 students was presented on topics ranging from stream water quality and soils.
- To date, Integrated Pest Management plans have been implemented on 1,022 acres.
- Conducted 735 basic soil tests, in addition, 15 fields encompassing 577 acres were tested for nitrate in the soil.
- The practices implemented to date on animal waste include: 15 waste management systems, 11 ag. waste storage facilities, and 4,500 feet of fencing.
- Erosion/sediment control practices installed to date include: 1,192 feet of fencing, 1,625 feet of diversion and 609 acres on cover and green manure crop.

OTHER AGENCIES: New Hampshire Department of Environmental Services, Rockingham County Conservation District, and Strafford County Conservation District.

REPORTING & EVALUATION: Ambient sampling program for total phosphorus, nitrogen, and chlorophyll; nutrient balance calculations, keeping records of reductions in pesticide and nutrient use, Farm*A*Syst will be used.

STATE: NEW HAMPSHIRE **PROJECT SIZE:** 378,400 acres.
PROJECT NAME: UPPER-CONNECTICUT RIVER **STARTED:** 1991
COUNTIES IN PROJECT: GRAFTON

CROPS/LIVESTOCK: Hay, corn, vegetables, apples; beef, and dairy cattle.

OBJECTIVES: Reduce non-point source water pollution from agricultural, forest, and urban lands and streambanks.

IMPACTS:

- Adoption of waste utilization by 12 dairies resulted in an estimated 66,600 lbs. of nitrogen and 39,350 lbs. of phosphorus being utilized rather than entering streams.
- Over 80 percent of planned practices for nitrogen and phosphorus management on crop/hay has been applied.

ACTIVITIES:

- Direct contact with the public about water testing, well treatment and septic systems reached over 5,000 people.
- Held demonstrations, workshops, meetings, one-on-one contacts to promote water quality.
- Information on proper pesticide application delivered via workshops, phone contacts, mailings, and newsletters.
- Nutrient management plans were developed and applied on 7,040 acres of annual cropland with dairy of 5,570 animal units.
- Summer nitrate nitrogen soil tests to more accurately determine the fertilizer nitrogen requirements of corn were run on a total of 3,331 acres of cropland.
- To date, integrated pest management plans have been developed and practiced on 1,361 acres.
- A cooperative speakers bureau is in place to respond to requests for participation in programs planned by community groups.

OTHER AGENCIES: New Hampshire Department of Environmental Services, and New Hampshire Timberland Association, Grafton County Conservation District.

REPORTING & EVALUATION: Computer models will be used; evaluate/monitor the impact of nutrient and pesticide application testing the Farm*A*Syst program.

STATE: NEW MEXICO **PROJECT SIZE:** 194,000 acres.
PROJECT NAME: DONA ANA/SIERRA **STARTED:** 1990
COUNTIES IN PROJECT: DONA ANA, SIERRA
CROPS/LIVESTOCK: Turf, silage corn, potatoes, vegetables, dairy and poultry.
OBJECTIVES: Reduce/manage the loading of nutrients, improve agricultural pest management practices; increase irrigation efficiency; reduce potential nitrate contamination from confined animal feeding operations; educate the general public on water quality issues.

IMPACTS:

- By split application of nitrogen, one farmer reduced input cost by $15 per acre.
- To date, irrigation efficiency has improved by 10% within the watershed.
- Integrated Pest Management utilizing economic thresholds has resulted in reducing the number of applications and sometimes eliminating the need for a particular insecticide.

ACTIVITIES:

- Developed New Mexico Farm*A*Syst program.
- Held meetings, workshops, radio spots, field days, demonstrations and farm tours to promote project goals.
- Produced a "groundwater movement" video for use in classrooms and public meetings.
- Published and distributed a booklet on "estimating soil moisture by feel and appearance."
- HUA staff works with 45 producers on 4500 acres.
- Intensive irrigation water management evaluations benefitted 14 cooperators representing 3,315 acres.
- Developed a groundwater movement model, water cycle mural, and 3-dimensional graphic displays for demonstrations.
- To date, nutrient management plans for nitrogen management have been implemented on 11,233 acres; pesticide management plans on over 4,111 acres, irrigation water management plans on 12,216 acres.

OTHER AGENCIES: Elephant Butte Irrigation District, New Mexico (NM) State Engineer's Office, and NM Environmental Department, NM Water Resources Research Institute, Environmental Protection Agency, U.S. Geological Survey.

REPORTING & EVALUATION: Economic analysis of Best Management Practice (BMP) adoption, soil nitrate correlations with changed management practices, post project survey of project cooperators and general farming community, Farm*A*Syst program will be used in pesticide management and groundwater protection.

STATE: NEW JERSEY
PROJECT NAME: GREAT SWAMP
COUNTIES IN PROJECT: MORRIS, SOMERSET

PROJECT SIZE: 35,500 acres.
STARTED: 1991

CROPS/LIVESTOCK: Fruits, vegetables, soybeans, corn; horses, beef, and sheep.

OBJECTIVES: Reduce fertilizer and pesticide impacts, determine water quality impairments, determine impact of hydrologic changes on watershed.

IMPACTS:

- Increased public awareness of reducing nonpoint source pollution within the watershed.
- Increased grower awareness of reducing the impact of nutrients and pesticides application within the project.

ACTIVITIES:

- Newsletters, 2,600 mailing lists, factsheets, slide shows were some of the methods used to promote water quality; HUA newsletters reach 300 individuals out of state.
- Developed a geographic information system database.
- Created 6 satellite displays for high visibility locations.
- Created a watershed data layer on sewer and un-sewered service areas.
- Developed information awareness on nutrient loadings and animal densities within the watershed.
- Development of a Home*A*Syst program.
- Estimated the amount of phosphorus and nitrogen produced by domestic and agricultural animals.
- Developed homeowner soil sampling project.

OTHER AGENCIES: U.S. Geological Survey, U.S. Fish & Wildlife Services, Environmental Protection Agency, Great Swamp Watershed Association, U.S. Forest Service, National Park Service.

REPORTING & EVALUATION: Monitor different agricultural models for evaluation of water quality; examples of the models are: Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), Chemical, Runoff, and Erosion from Agricultural Management Systems (CREAMS), and Agricultural Nonpoint Source (AGNPS).

STATE: NEW YORK
PROJECT NAME: EAST SIDNEY LAKE
COUNTIES IN PROJECT: DELAWARE
CROPS/LIVESTOCK: Corn, hay, and dairy cattle.
PROJECT SIZE: 70,800 acres.
STARTED: 1990
OBJECTIVES: Reduce nutrient enrichment of the reservoir by reducing erosion, properly manage animal waste septic systems; cost sharing for integrated crop management.

IMPACTS:

- Installed conservation practices which resulted in 315 tons of soil saved on 309 acres.
- Implementation of Best Management Practices has reduced: nitrogen application by 622 pounds and phoshphorus by 4432 pounds to date in the watershed.
- 5,906 tons of recycling material were recovered by residents in 1992.
- Good efforts on establishing a household hazardous wastewise program. Highly commended.

ACTIVITIES:

- Incorporated portions of the Farm*A*Syst into county programs.
- Livestock produces 100,000 tons of manure containing 500,000 pounds of phosphorus (P_2O_5) per year.
- Soil tests indicated that 73% of farms in the watershed did not need additional fertilizer nitrogen to support farm's yield goal.
- Twenty-nine teens were trained to teach household hazardous wastewise program to 2627 youth in 14 schools in Delaware county.
- 19 schools participated in a recycling workshop.
- 235 students and teachers received earth day composting presentation.

OTHER AGENCIES: U.S. Army Corps of Engineers, New York Department of Environmental Protection, and New York Division of Fish and Wildlife.

REPORTING & EVALUATION: Mathematical models such as Erosion Productivity Impact Calculator (EPIC), Barnyard Area Runoff Nutrient Yield (BARNY), General Watershed Loading Function (GWLF) and Agricultural Manure Management (AGMAN) will be run to identify loadings, Geographic Information System (GIS) will be used to evaluate delivery ratios.

STATE: NORTH CAROLINA **PROJECT SIZE:** 133,290 acres.
PROJECT NAME: GOSHEN SWAMP **STARTED:** 1990
COUNTIES IN PROJECT: DUPLIN, SAMPSON, WAYNE

CROPS/LIVESTOCK: Corn, soybeans, vegetables, small grain, tobacco, cotton; swine, turkeys, and broilers.

OBJECTIVES: Reduce nutrient and pesticide transport to surface and groundwater, reduce cropland erosion and sedimentation; accelerate the adoption of Best Management Practices (BMPs).

IMPACTS:

- Adoption of waste utilization on 459 acres resulted in 225,832 tons of manure being effectively utilized in the project.
- Implementation of Best Management Practices for nutrient management resulted in reduced nitrogen (NO_3-N) application of 75,426 pounds on 1934 acres.
- Recycled 3,000 pounds of pesticide containers.
- Treatment of 11,963 acres of cropland for erosion control resulted in 34,113 tons of soil saved.

ACTIVITIES:

- To date, 5,241 people have attended field days.
- Produced 2 water quality videos.
- Conducted meetings, demonstrations, tours, workshops, and homeowner education to promote water quality.
- Pesticide recertification classes have been held over 500 applicants.
- Installed 39 waste treatment lagoons to apply animal waste on 459 acres.
- Installed 2 compost facilities.
- Installed a constructed wetland to treat animal waste.

OTHER AGENCIES: USDA-Agricultural Research Service, the U.S. Geological Survey, the North Carolina Department of Environmental Control, and North Carolina Department of Health and Natural Resources.

REPORTING & EVALUATION: Model results from the Herrings Marsh Run Water Quality Demonstration Project, which is within the Goshen Swamp Project, will be extrapolated to predict the water quality impacts of Best Management Practices (BMP's) implemented in the project area.

STATE: NORTH DAKOTA **PROJECT SIZE:** 320,640 acres.
PROJECT NAME: BOWMAN/HALEY **STARTED:** 1990
COUNTIES IN PROJECT: BOWMAN
CROPS/LIVESTOCK: Small grains, hay, pasture, beef and sheep.

OBJECTIVES: Reduce excessive erosion; reduce nutrient loading from animal waste; enhance rangeland; improve quality of wildlife habitat; develop Geographic Information System (GIS) coverage, provide technical service for all minorities, provide cost share assistance.

IMPACTS:

- To date, animal waste from 20 beef and sheep facilities has been efficiently utilized on 24,696 acres.
- Adoption of conservation practices for erosion and sediment control resulted in 107,686 tons of soil saved over 58,315 acres in 1994.
- Implementation of best management practices for sediment control resulted in reduced wind erosion from 15 to 14 percent.
- In FY 1994, effective application of nutrient management plans resulted in 20 percent reduction in the amount of nutrients that was prevented from entering the reservoir.

ACTIVITIES:

- In 1994, 13 conservation plans were writeen on 35,151 acres.
- Developed and distributed newsletters and fact sheets about project goals.
- Conducted tours, one-on-one contacts, and field days to promote water quality.
- Implemented demonstrations such as: test plots of six alfalfa varieties, a grass test plot of 36 varieties, and two tillage residues.
- Conducted radio and TV broadcasts and updated the project water quality video.
- Conducted 304 erosion sediment control practices to date on 95,717 acres.
- To date, application of conservation practices resulted in the sealing of 5 abandoned wells, the installation of 12 livestock water tanks, and pasture and heryland management on 5,770 acres.

OTHER AGENCIES: U.S. Army Corps of Engineers, U.S. Fish & Wildlife Service, North Dakota Game and Fish Department, Custer National Forest, Ducks Unlimited, North Dakota Health Department, Bowman County Water Resources Board, Ducks Unlimited Inc., Bowman County Weed Board.

REPORTING & EVALUATION: Compile well and monitoring sites data; digitize soil survey; evaluation will be based on amount of sediments not delivered, measurement also based on amount of nutrients prevented from entering a reservoir.

STATE: OHIO **PROJECT SIZE:** 63,000 acres.
PROJECT NAME: INDIAN LAKE **STARTED:** 1990
COUNTIES IN PROJECT: LOGAN, HARDIN, AUGLAIZE
CROPS/LIVESTOCK: Corn, soybeans, wheat; dairy, beef and swine.

OBJECTIVES: Reduce sediment delivery; provide innovative program incentives.

IMPACTS:

- The implementation of the Resource Management Systems means that 4,921 tons of soil will be saved per year from sheet and till erosion and 5,246 tons/year from gully erosion.
- Land use change data collected to date estimates that sheet and till erosion in the watershed has been reduced to 200,000 tons per year.

ACTIVITIES:

- A residue cover of 30 percent has been shown to decrease erosion by 50 percent.
- Held a plastic pesticide container recycling program.
- Conducted Integrated Crop Management consultations with 60 farmers.
- A residue cover of 30 percent has been shown to decrease erosion by 50 percent.
- Installed 16,915 acres of conservation tillage practices and 61 acres of grassed waterways.
- Conducted tours, demonstrations, meetings, field days and radio spots to promote project goals.
- Implementation of the resource management plans will result in a saving of 10,167 tons of soil per year.
- A total of 28 resource management system plans were written for a total of 4,616 acres.
- Published factsheets, newsletters, magazines and newspaper articles to promote water quality goals.

OTHER AGENCIES: Ohio Environmental Protection Agency, Ohio Department of Natural Resources, Indian Lake Development Corporation, Logan and Hardin County Pheasants Forever Chapters, Ohio Department of Transportation, and the Division of Forestry and Wildlife.

REPORTING & EVALUATION: Ohio Environmental Protection Agency will do monitoring in the last two years of the project; tracking land use changes in the watershed; Geographic Information Systems (GIS) will be used.

STATE: OHIO **PROJECT SIZE:** 334,554 acres
PROJECT NAME: DARBY CREEK **STARTED:** 1991
COUNTIES IN PROJECT: CHAMPAIGN, FRANKLIN, LOGAN, MADISON, PICKAWAY, UNION
CROPS/LIVESTOCK: Corn, soybeans, wheat, hay, dairy, and beef cattle.
OBJECTIVES: Reduce sediments; protect riparian corridor; provide nutrient and pest management plans; protect streambanks.

IMPACTS:

- Conservation tillage and increased area seedings established as a result of the project have reduced sediment yield to the stream by 28,500 tons.
- Implementation of conservation practices to reduce sediment loadings has resulted in 57 percent of goal of reaching 50,000 tons of sediment per year in the watershed.
- Promotion of residue management practice with producers across the watershed resulted in an increase of 30,500 new acres of conservation tillage, a 33 percent increase over 1993.
- According to the watershed transect, crop residue management trend was up with the average residue after planting going from 15 percent in 1992 to 41 percent in 1994.

ACTIVITIES:

- USGS is monitoring pesticides, nutrients and suspended solids on a daily basis.
- Held meetings, demonstrations, field days, farm tours, workshops and canoe trips to promote water quality.
- A set of water quality curriculum materials has been adapted in the watershed for the youth.
- Produced a videotape to market outreach efforts to farmers.
- Utilized volunteers in conducting HUA activities (550 days of volunteer time).
- HUA displays have been used at seven events in the watershed.
- Promotion of residue management practice with producers resulted in 30,500 acres increase in conservation tillage.
- Published factsheets, brochures and newsletters on project activities.
- The risk assessment system being developed is the USEPA's Eco Risk Assessment.
- Three in-stream monitoring devices have been installed to track long-term trends.
- To date, the projects has applied 4,900 acres of nutrient and pest management plans.

OTHER AGENCIES: Environmental Protection Agency, U.S. Geological Survey, U.S. Forest Service, and Ohio Department of Natural Resources, Agricultural Nonpoint Source (AGNPS).

REPORTING & EVALUATION: Remote sensing; (DIS), Computer Assisted Management Planning System (CAMPS); chemical and biological, Geographic Information System (GIS).

STATE: OKLAHOMA
PROJECT NAME: BATTLE BRANCH
COUNTIES IN PROJECT: DELAWARE
CROPS/LIVESTOCK: Pasture, hay, poultry; dairy, and beef cattle.

PROJECT SIZE: 37,549 acres.
STARTED: 1990

OBJECTIVES: Reduce nutrient levels in the watershed, develop education program to improve producers' understanding of utilizing animal waste, provide technical and financial assistance.

IMPACTS:

- Implementation of best management practices on 2,721 acres by 33 producers resulted in the savings of 272,100 lbs of nitrogen (NO_3-N), and 326,520 lbs of phosphorus (P_2O_5) from entering the streams.
- Over 75 percent of the producers have reduced waste application rates or, quit applying waste in unsuitable areas as a result of technical assistance and information programs.
- Since the project was implemented, 78 percent of the producers with confined animal operation (Poultry and Dairy), have developed waste management plans for their operations.

ACTIVITIES:

- Held meetings, tours, demonstrations, field days to promote project goals.
- Developed forage production plots demonstrating the effect of using litter as replacement for fertilizer.
- Implemented BMPs in the project for N&P management include: 45 waste management systems, 33 waste utilization systems, 31 dead bird disposal systems, 6 waste storage structures and 11 nutrient management plans, 150 acres of tree planting, and 16 household septic systems.
- To date, 25 dead bird poultry composters have been installed.
- To date, 60 wells have been tested.

OTHER AGENCIES: Oklahoma Conservation Commission, and Delaware Conservation District, and the Environmental Protection Agency.

REPORTING & EVALUATION: Practices will be implemented during on-site visits, manure nutrient and soil nutrient content will be monitored, baseflow stream supplies will be taken monthly.

STATE: OKLAHOMA
PROJECT NAME: PEACHEATER CREEK
COUNTIES IN PROJECT: ADAIR
PROJECT SIZE: 16,210 acres.
STARTED: 1991
CROPS/LIVESTOCK: Wheat, fescue, bermudagrass; poultry, dairy, and beef cattle.

OBJECTIVES: Reduce level of nutrients and bacteria.

IMPACTS:

- As a result of technical assistance and information progress, 63 percent of producers have reduced their waste application rates and/or quit applying waste on unsuitable areas.
- Adoption of waste utilization by 31 dairies on 3,606 acres resulted in an estimated 360,600 lbs of nitrogen and 432,720 lbs of phosphorus from manure being utilized rather than entering streams.
- Producers have employed 80% of nutrient management recommendations offered for their use.

ACTIVITIES:

- Conducted tours, workshops, demonstrations, and field days to promote water quality.
- Produced and distributed newsletters, brochures, factsheets to promote project goals.
- To date, over 63 percent of the producers with confined animal operations (Poultry and Dairy or Beef) operations have developed waste management plans for their operations.
- Practices planned and installed within the project include: 26 waste utilization systems over 3,606 acres, or 11 dead bird disposal systems, 12 waste storage structures, 31 nutrient management plans on 2,916 acres, and 9 household septic systems.
- To date, 78 wells have been tested.
- Developed plans to implement Farm*A*Syst program within the project.

OTHER AGENCIES: Oklahoma Conservation Commission, Adair Conservation District, Environmental Protection Agency, and the Oklahoma Agricultural Experiment Station.

REPORTING & EVALUATION: Monitor manure nutrient content, soil nutrient levels; well sampling. SIMPLE model will be employed.

STATE: OREGON
PROJECT NAME: ONTARIO
COUNTIES IN PROJECT: MALHEUR
PROJECT SIZE: 157,000 acres.
STARTED: 1990
CROPS/LIVESTOCK: Onions, sugarbeets, potatoes, alfalfa, wheat, sweet corn, seed crops, beef, and dairy cattle.
OBJECTIVES: Reduce sediment entering watershed; reduce nitrogen application; reduce pesticide use.

IMPACTS:

- Sixty percent of the 95 dairies in the project have adequate animal waste facilities.
- Adoption of irrigation water management practices on 20,855 acres resulted in improved irrigation efficiency by 12 percent.
- Sediment control practices adapted by producers resulted in reduced sedimentation of 15 tons per acre on 5,000 acres for a total of 75,000 tons.
- Adoption of nutrient management plans resulted in reduced nitrogen (NO_3-N) application by 48 lbs on 19,500 acres for a total of 936,000 pounds reduced.

ACTIVITIES:

- Written ninety-eight farm plans covering 19,325 acres in the project area.
- Conducted tours, meetings, on-farm demonstration and youth education to promote water quality.
- Implemented the following practices to date: irrigation scheduling on 4,960 acres, 4,890 acres of sprinkler irrigation work on nitrogen management.
- Developed and implemented sediment control practices of conservation cropping on 13,432 acres.
- Installed 10 waste management systems and 4 waste storage structures for animal waste utilization on 110 acres.
- Applied nutrient management plans on 23,802 acres.

OTHER AGENCIES: Oregon Department of Agriculture, Department of Environmental Quality, Malheur County Soil and Water Conservation District, Environmental Protection Agency Oregon Department of Health, and Oregon Water Resources Department.

REPORTING & EVALUATION: Monitoring and updating water quality farm plans; evaluate impacts of installed management systems; Monitoring irrigation return flows for nitrate, ammonium and phosphorous; well monitoring; vadose zone sampling; computer models being used or tested in the watershed are Furrow Erosion and Sediment Model (FUSED), Farm Irrigation Rating Index (FIRI), Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), Erosion Productivity Impact Calculator (EPIC), Simularot for Water Resources in Rural Basins-Water Quality (SWRRBWQ), and Nitrate
Leaching and Economic Analysis Package (NLEAP).

STATE: OREGON **PROJECT SIZE:** 175,845 acres.
PROJECT NAME: TUALATIN RIVER **STARTED:** 1991
COUNTIES IN PROJECT: WASHINGTON
CROPS/LIVESTOCK: Nurseries, row crops, orchards, seed crops, Christmas trees, cannery products; dairy, beef, horses, sheep, swine, and poultry.
OBJECTIVES: Reduce sediment, nutrient, and pesticide loadings; reduce bacterial content.

IMPACTS:

- Adoption of nutrient management plans by 4 dairies on a 120 acre farm resulted in reduced nitrogen ($N0_3$-N) application by 25,800 pounds, phosphorus (P_20_5) by 12,000 pounds, and potassium by 18,000 pounds total, on 120 acres.
- Implementation of sediment control practices resulted in a savings of 95,832 tons of soil on 2575 acres.
- Developed marketing strategies that resulted in increased participation of producers in water quality implementation.
- Soil testing and adjustments of fertilizer rates on sweet corn production by 3 operators reduced phosphorus (P_2O_5) application by 60,000 pounds on 150 acres.
- Resource management plans developed on 19,173 acres resulted in 77,524 tons of manure being effectively utilized rather than entering streams.
- Reductions in sediment load from erosion control practices resulted in 8,624 tons reduction of sediment carried as runoff into the stream.

ACTIVITIES:

- Held meetings, tours and field days to promote water quality.
- Held cover crop demonstrations on blueberries, bush beans, commercial roses, strawberries, sweet corn and christmas trees.
- Held demonstration on straw mulching and waste handling.
- Newspaper articles, brochures, fact sheets, publications were used in promoting water quality
- Used nutrient budget and balance approach to document reductions in nutrient use.
- Installed 6 animal waste storage structures and 6 roof water management systems.
- Applied 209 acres of conservation tillage practices and 128 acres of crop residues for sediment control practices.
- To date, nutrient management plans for nitrogen and phosphorus have been implemented on 9,484 acres.

OTHER AGENCIES: Oregon Department of Environmental Quality, U.S. Geological Survey, Unified Sewage Agency, Oregon Graduate Institute, Tualatin Valley Irrigation District, Oregon Department of Agriculture, and the Oregon Department of Forestry.

REPORTING & EVALUATION: In-stream water quality monitoring; EPIC will be used to evaluate the effectiveness of management systems.

STATE: PENNSYLVANIA **PROJECT SIZE:** 135,000 acres.
PROJECT NAME: PEQUEA/MILL CREEKS **STARTED:** 1991
COUNTIES IN PROJECT: LANCASTER
CROPS/LIVESTOCK: Soybeans, wheat, barley, alfalfa, corn, mixed hays, tobacco; dairy, heifers, beef, swine, poultry, and horses.
OBJECTIVES: Reduce sediment and nutrient loads; reduce bacteria, sediment runoff, reduce pesticide contamination.

IMPACTS:

- Of the total water quality project acres needing practices for crop/hay, 15% of goal has been accomplished for nitrogen, 10% percent for phosphorus management, 11% for pesticide management, and 14% for erosion and sediment control practices.
- Livestock exclusion from streams has resulted in expansion of riparian wildlife habitat.

ACTIVITIES:

- A total of 37 farms in the project area have installed streambank fencing for a total of 86,093 feet.
- To date, 162 contracts have been signed with landowners.
- Developed nutrient management plans for 346 farmers in the project area.
- 47 acres of barnyard runoff control, 4 acres of vegetative filter strips, 258 acres of pest management practices have all been installed.
- Installed waste storage facilities on 68 farms, and farmstead assessment on 47 farms.
- Conducted tours, meetings, and field days to promote water quality.
- Published factsheets, brochures, and newsletters to promote project goals.
- Developed nutrient and pesticide training courses, and 69 radop spots.
- Developed a project display for exhibition at events, and a video for non-farm
- Developed pest management plans for 284 farms.

OTHER AGENCIES: Lancaster Conservation District, Pennsylvania (PA) Department of Agriculture, PA Department of Environmental Resources, PA Fish Commission, PA Game Commission, U.S. Geological Survey, Environmental Protection Agency, Chesapeake Bay Foundation, The Nature Conservancy.

REPORTING & EVALUATION: Monitoring base flows, record keeping, remote sensing, evaluate nutrient and pesticide loadings; farmstead assessment, GIS, habitual evaluation, conservation reporting and evaluation system will be used.

PUERTO RICO **PROJECT SIZE:** 101,380 acres.
PROJECT NAME: LAKE LOIZA **STARTED:** 1990
COUNTIES IN PROJECT: LAKE LOIZA, in the RIO GRANDE, DE LOIZA WATERSHED

CROPS/LIVESTOCK: Yams, plantains, dasheens, oranges, coffee, sugarcane, pasture; dairy, beef cattle, poultry, and swine.
OBJECTIVES: Reduce chemical and organic matters entering the watershed, reduce erosion to maintain the resource base; reduce offsite sediment damages.

IMPACTS:

- Adoption of sediment control practices by producers has resulted in reduced sediment load 18,279 tons/ac/year on 3,937 acres of cropland.

ACTIVITIES:

- Established two farm demonstration projects for poultry, swine, and dairy cattle.
- Established a demonstration project on constructed wetland.
- Installed erosion control practices on 250 acres of cropland.
- 326 producers have installed the following practices conservation tillage on 6,650 acres, crop residue on 5,754 acres hillside ditches on 635 acres.

OTHER AGENCIES: Este and Turabo Conservationist Districts, Puerto Rico Environmental Quality Board, and U.S. Geological Survey.

REPORTING & EVALUATION: Field data collected by U.S. Geological Survey on sedimentation rate of the reservoir; Environmental Quality Board will conduct analysis to determine surface and ground water with respect to non-point source impacts in the near future.

STATE: RHODE ISLAND **PROJECT SIZE:** 194,000 acres.
PROJECT NAME: PAWCATUCK **STARTED:** 1990
COUNTIES IN PROJECT: WASHINGTON
CROPS/LIVESTOCK: Turf, silage corn, potatoes, nursery, vegetables; dairy, and poultry.

OBJECTIVES: Reduce/manage the loading of nutrients, pesticides and pathogens; maintain water levels to support designated uses; develop support among agricultural and non-agricultural communities for solutions to nonpoint source problems through public information program.

IMPACTS:

- Over 50 percent of the dairy farmers in the project are participating in a comprehensive soil and manure nutrient testing program followed by a timed nitrate test.
- Integrated Pest Management (IPM) practice of using traps to control Japanese beetles resulted in the elimination of the need to spray trichlorfon on 25 acres of one golf course.
- IPM strategies adopted resulted in estimated reductions in pesticide use on golf course in FY 94 to be 200 pounds of active ingredient of Dylox (trichlorfon on over 25 acres.
- Measured versus farmer-perceived manure application rates were compared in a manure spreader calibration workshop. Results suggested that the farmers' actual application rates were within 15 percent of the targeted rate.
- Adoption of irrigation water management practice resulted in a greenhouse saving 131 inches of water applied per acre with 55 percent improvement in irrigation efficiency.
- To date, the adoption of nutrient practices resulted in reduced nitrogen (NO_3-N) application of 57,885 pounds, and reduced phosphorus (P_20_5) application of 55,638 pounds, over 435 acres prevented from entering streams.
- On continuous corn production, land receiving cow manure and commercial fertilizers, reduced nitrogen (NO_3-N) application was estimated at 3,875 pounds over 155 acres prevented from entering streams in FY 1993.
- The application of erosion control practices on erodible land resulted in average phosphorus reduction of 2,600 pounds over 130 acres.
- IPM strategies adopted on apple production showed estimated reductions in pesticide use as follows: reduced Captan 50WP use by 82.5 pounds of active ingredient (a.i.) over 5.5 acres; reduced Rubigan 50WP use by 0.57 pounds of a.i., Dodine 65WP by 6.2 pounds of a.i., Imidan 50WP by 93 pounds of a.i., and Vendex 50WP by 1.54 pounds, all reduced over 5.5 acres.

ACTIVITIES:

- Conducted farm tours, field demonstrations, one-on-one contacts to promote water quality.
- Developed brochures, factsheets, and pesticide applicator training courses to promote project goals.
- Statewide programs in Integrated Pest Management were expanded resulting in increased focus on pesticide management.
- Greenshare Program serves to educate the public on basic plant diagnosis, pesticide safety, organic and alternative control of insects, and spreader calibration.
- Installed irrigation water management practice on 691 acres.
- In FY 1994, six volunteers including interns contributed over 800 hours of volunteer service to the project.

OTHER AGENCIES: Rhode Island (RI) Department of Environmental Management, Wood-Pawcatuck Watershed Association, RI Farm Bureau, Coastal Resources Management Council, RI Department of Health, RI Water Resources Board, U.S. Geological Survey and the Environmental Protection Agency.

REPORTING & EVALUATION: Use computerized simulation models, such as Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), to evaluate BMP's effectiveness; economic evaluation of management systems; evaluate program adoption through direct interactions with producers; use the "Kitchen Table Method,"
and NPVRG (National Pesticide Soils Database user support system for the Risk Assessment for Ground and Surface water contamination).

STATE: SOUTH CAROLINA **PROJECT SIZE:** 129,700 acres.
PROJECT NAME: BUSH/CAMPING CREEK **STARTED:** 1990
COUNTIES IN PROJECT: LEXINGTON, NEWBERRY

CROPS/LIVESTOCK: Corn, soybeans, grain sorghum, small grains, pasture; dairy, beef, swine, and poultry.

OBJECTIVES: Reduce erosion, reduce animal waste impact on streams and water bodies; monitor water bodies in watershed, provide financial and technical assistance, implement information program.

IMPACTS:

- Over 13,100 tons of animal waste have been effectively utilized on 1,664 acres of cropland.
- Adoption of Best Management Practices by 152 landusers on 2,661 acres resulted in 5,000 tons of soil saved in 1994.
- Improved fishery habitat due to sediment reduction in streams.

ACTIVITIES:

- To date, 38 waste management systems have been completed resulting in waste utilization on 3873 acres on animal waste practices.
- Held demonstrations, field days, farm tours and workshops to promote project goals.
- Twenty-three Forest Stewardship plans have been completed on 3,615 acres.
- Published newsletters, news-articles, magazines to promote project activities
- Application of erosion/sediment control practices have resulted in the following being installed: 16,378 acres of conservation tillage, 27,792 feet of fencing, 29,500 feet of terracing, and 14,440 acres of pasture and hayland planting.
- Over 500 students and teachers have participated in water quality education programs in the project.

OTHER AGENCIES: South Carolina Department of Health and Environmental Control, U.S. Forest Service, Soil and Water Conservation District, and South Carolina Land Resources Commission.

REPORTING & EVALUATION: Monitor dissolved oxygen, pH, temperature, conductivity and fecal coliform, Geographic Information System (GIS) will be used for tracking trends and changes, the Agricultural Nonpoint Source (AGNPS) model will also be used as a comparative analysis tool.

STATE: SOUTH CAROLINA **PROJECT SIZE:** 60,000 acres.
PROJECT NAME: LAKE BOWEN **STARTED:** 1991
COUNTIES IN PROJECT: GREENVILLE, SPARTANBURG

CROPS/LIVESTOCK: Peaches, apples, plums, nectarines, vegetables, small grains, hay crops, corn, soybeans, pasture; dairy, sheep, swine, beef, and horses.

OBJECTIVES: Reduce nutrient, pesticide and nutrient loadings; monitor water bodies in the watershed.

IMPACTS:

- One-on-one meetings and on-farm demonstrations have resulted in 80% of the producers participating in Integrated Crop Management Program.
- Implemention of conservation practices with 36 landusers resulted in a saving of 4,164 tons of soil.
- In 1993, application of Integrated Pest Management practices resulted in reduced pesticide use as follows: Bravo 1.5 lbs a.i. (active ingredients), mancozeb 12 lbs a.i, captan 2 lbs a.i. and etheyl Parathion 1.5 lbs a.i.

ACTIVITIES:

- To date, practices for nutrient management have been applied on 1,344 acres of cropland and 1,314 acres for pesticide management.
- Conducted meetings, fairs, TV programs to promote project goals.
- Published brochures, factsheets, newsletters to inform producers and the general public about water quality goals.
- To date, 6 ponds and 1 sediment basin have been installed for sediment control.
- Application of erosion and sediment control practices have resulted in 10,025 feet of fencing.

OTHER AGENCIES: Department of Health and Environmental Control, South Carolina Forest Commission, South Carolina Land Resource Commission, Environmental Protection Agency, and the Spartanburg Water System.

REPORTING & EVALUATION: Monitor biological and physical parameters; Agricultural Nonpoint Source (AGNPS) pollution model will be used to exclude livestock from streams, 7,000 feet of field boarders, and 1,088 acres in pasture and hayland planting.

SOUTH DAKOTA **PROJECT SIZE:** 92,000 acres.
PROJECT NAME: RICHMOND LAKE **STARTED:** 1990
COUNTIES IN PROJECT: BROWN, EDMUNDS, MC PHERSON

CROPS/LIVESTOCK: Spring wheat, alfalfa, corn, millet, sunflowers; and beef cattle.
OBJECTIVES: Control feedlot runoff, reduce livestock waste, reduce soil erosion, install shoreline structures; reduce septic system impact on water quality.

IMPACTS:

- Adoption of nutrient management plans resulted in reduced phosphorus loading by 2.5 tons per year on the average on 3230 acres of cropland.
- Implementation of sediment control practices resulted in reduced sediment lost by .008 ton/ac/yr.
- Application of nutrient management practices have resulted in reduced nitrogen and phosphorus losses from the root zone by 100 pounds each on 2,486 acres of cropland.

ACTIVITIES:

- Sponsored two seminars on computer program for livestock waste management.
- Developed a mailing list of over 200 individuals and agencies.
- Developed factsheets for agricultural waste management and septic system installation.
- Developed 2 television news spots, 2 radio spots, and 3 newsreleases to promote water quality.
- Held meetings, tours, one-on-one contacts, to promote water quality.
- Designed shoreline stabilization for 2240 linear feet of shoreline.
- Installed 6 erosion and sediment control practices on 3,230 acres.
- Shoreline stabilization completed on 2288 linear feet of shoreline.
- 6400 linear feet of fence, one water tap and one stock dam installed to provide livestock exclusion from the lake streamline in 274 acres of pasture.
- Completed field taping of project video.

OTHER AGENCIES: Environmental Protection Agency, South Bound Conservation District, and South Dakota Department of Environment and Natural Resources, U.S. Fish and Wildlife Service.

REPORTING & EVALUATION: Monitor Richmond Lake water quality to sample water entering lake; water analysis will be done by Environmental Protection Agency for fecal coliform bacteria, suspended solids, phosphorus, nitrates, and chlorophyll.

STATE: SOUTH DAKOTA **PROJECT SIZE:** 196,601 acres.
PROJECT NAME: LOWER RAPID CREEK **STARTED:** 1991
COUNTIES IN PROJECT: PENNINGTON
CROPS/LIVESTOCK: Hay, pasture; sheep, dairy, and beef cattle.
OBJECTIVES: Reduce seepage,sediment load;promote proper pesticide and fertilizer use.

IMPACTS:

- Adoption of erosion control practices has saved 14,700 tons of soil that has the potential of reaching Rapid Creek.
- In 1991 - estimated total nitrogen saved = 11,144 lbs.
  - estimated total phosphorus saved = 4,458 lbs.
- In 1992 - estimated total nitrogen saved = 62,410 lbs.
  - estimated total phosphorus saved = 24,964 lbs.
- In 1993 - estimated total nitrogen saved = 65,475 lbs.
  - estimated phosphorus saved = 26,190 lbs.
- Reduced sediment yield 0.55 tons/ac/yr on 50,818 acres installed for a total reduction of 27,950 tons.
- 33% of producers that attended irrigation water management workshops adopted new management practices.

ACTIVITIES:

- Produced newsletters, brochures, factsheets; completed Geographic Information System (GIS), all to promote water quality.
- Promoted cost share programs and conservation planning.
- Installed conservation practices such as stockwater ponds, windbreaks, fences, and land leveling.
- Conducted well water testing program for 100 participants.
- Implemented nutrient, pest, and erosion control plans to reduce nutrient, and sediment loadings.
- Completed 39 radio programs with project involvement.
- Completed three pesticide applicator training sessions.

OTHER AGENCIES: Bureau of Reclamation, South Dakota Department of Water and Natural Resources, Environmental Protection Agency, U.S. Geological Survey, U.S. Corp of Engineers, South Dakota Department of Agriculture, Fish and Wildlife Service, Corps of Engineers.

REPORTING & EVALUATION: Daily weather monitoring; evaluate loading of nutrients; monitor wells and gauging stations.

STATE: TENNESSEE **PROJECT SIZE:** 77,000 acres.
PROJECT NAME: NORTH FORK CREEK/FALL CREEK **STARTED:** 1990
COUNTIES IN PROJECT: BEDFORD
CROPS/LIVESTOCK: Soybeans, corn, wheat, alfalfa, tobacco; beef, dairy, poultry, and swine.
OBJECTIVES: Reduce (1) sediment delivery, organic wastes and bacteria from surface runoff; (2) reduce leaching of nutrients and bacteria into groundwater; (3) determine effectiveness of Best Management Practices (BMPs) in improving surface and groundwater quality.

IMPACTS:

- Integrated Pest Management strategies adopted by several producers have reduced thistle control by 50 percent per farm.
- Implementation of erosion control practices such as conservation tillage has resulted in 71,248 tons of soil saved on 8,906 acres.
- Effective adoption in nutrient management practices on over 911 acres resulted in reductions of 54,870 pounds of nitrogen (NO_3-N) and 27,770 pounds of phosphorus (P_2O_5) being utilized rather than entering streams.
- Installation of erosion control practices on a total of 10,303 acres of crop and pasture land saved 83,758 tons of soil per year.

ACTIVITIES:

- Implemented a low-pressure pipe septic system as a demonstration for alternative septic systems for use in shallow or sandy soils.
- Water flow model and water quality display have been featured at several functions.
- 246 soil samples analyzed and fertility recommendations made.
- Field record book for Integrated Crop Management (ICM) developed and pilot tested.
- Pesticide applicator training was made available to farmers.
- Held demonstrations, tours, one-on-one contacts, field days, radio spots, to promote project goals.
- Developed a water quality videos on Septic System Management and Alternatives.
- Installed pest management practices on 962 acres of crop/hay for surface-groundwater protection.
- To date, nutrient management plans have been installed on 5,888 acres of crop/hay for nitrogen and phosphorus management; and 12,734 acres on crop/hay for erosion/sediment control practices.

OTHER AGENCIES: TN Department of Environment and Conservation, TN Wildlife Resources Agency, U.S. Geological Survey, TN Valley Authority, TN Department of Agriculture, TN Division of Forestry and the Farm Bureau.

REPORTING & EVALUATION: Biological monitoring; well testing, and storm event monitoring.

STATE: TENNESSEE **PROJECT SIZE:** 95,450 acres.
PROJECT NAME: BEAVER CREEK **STARTED:** 1991
COUNTIES IN PROJECT: FAYETTE, HAYWOOD, SHELBLY, TIPTON
CROPS/LIVESTOCK: Cotton, soybeans, small grains, corn, wheat; beef cattle, and poultry.
OBJECTIVES: Reduce sediment, pesticide and nutrient delivery to surface water; reduce leaching of pesticides and nutrients to groundwater, verify Best Management Practice impact.

IMPACTS:

- Implementation of erosion control practices resulted in reduced sheet and rill erosion an average of 23 tons per acre.
- Sediment basins have reduced gully erosion from an average of 77 tons per acre to one ton per acre.
- Contour strip cropping has reduced sheet and rill erosion by 9 tons per acre for a total reduction of 5,940 tons over 660 acres.
- Nutrient management practices implemented on 5,651 acres resulted in reduced nitrogen (NO_3-N) application 226,040 lbs and phosphorus (P_2O_5) application of 339,060 lbs.
- Permanent vegetative cover practice has redued sheet and rill erosion from an aveage of 14 tons to one ton per acre.

ACTIVITIES:

- Conducted field days, tours, and demonstrations to promote water quality.
- Developed a portable display to promote project goals.
- Currently developing Farm*A*Syst for use in the project.
- Implemented nutrient management plans on 5,651 acres to date with 880 soil testing practices conducted.
- Installed pest management practices on 33,700 acres.
- 360 wells have been tested to date in 4 farmsteads.
- To date, erosion/sediment control practices have been implemented on 89,432 acres to cropland.

OTHER AGENCIES: TN Department of Agriculture, U.S. Geological Survey, TN Department of Health and Environment, TN Division of Forestry, TN Valley Authority, Farm Bureau Federation and the Longtown Gin.

REPORTING & EVALUATION: Water monitoring; biological and chemical monitoring; Tennessee Aquatic Database System (TADS) for sample analysis, Farm*A*Syst.

STATE: TEXAS **PROJECT SIZE:** 290,040 acres.
PROJECT NAME: UPPER NORTH BOSQUES **STARTED:** 1990
COUNTIES IN PROJECT: ERATH, HAMILTON
CROPS/LIVESTOCK: Pasture, peanuts, range, hay, orchard, dairy, and beef cattle.

OBJECTIVES: Reduce fecal coliform levels; accelerate pollution control practice adoption by producers, educate dairy owners and managers on water pollution problems arising from improperly designed dairy waste management systems; provide technical assistance, establish costs for dairy waste management structures.

IMPACTS:

- Adoption of soil testing and nutrient management plans resulted in an estimated 1,781,640 pounds of nitrogen, 890,820 pounds of phosphorus, and 2,004,345 pounds of potassium being utilized from dairy manure.
- Water conservation practices adopted by 11 dairy farms resulted in a cumulative reduction of 4,553,010 gallons of waste water produced per year and provided electricity savings of approximately $351/dairy/year.
- Integrated pest management strategies adopted by over 115 producers have reduced insecticide use for dairy housefly control by 89% per farm.
- Crop residue management implemented by 43 farms on 2,251 acres reduced sediment losses of 6,753 tons from the edge of the field for a total of 15,201,003 tons reduced.
- To date 50 producers have installed integrated pest management practices on 3,253 acres.
- This practice resulted in reduced (pesticide) use of pyrethroids at 376 pounds of active ingredients and reduced organo-phosphates of 752 lbs. and on over 3,253 acres of croplands.
- Approximately 44,541 tons of dairy manure per year was effectively utilized on 9,878 acres of cropland as a result of producer adoption of waste utilization.
- Elevn dairy farms adopted water conservation practices that reduced groundwater consumption by an average of 2 gallons/cow/day or a cumulative of 154 acre feet/year of ground water from the aquifier.
- Adoption of soil testing and nutrient management plans resulted in over 1,781,640 pounds of nitrogen, 890,820 pounds of phosphorus, and 2,004,345 pounds of potassium being utilized from dairy manure.
- Water conservation practices adopted by 11 dairy farms resulted in a cumulative reduction of 4,553,010 gallons of waste water produced per year and provided electricity savings of approximately $351/dairy/year.
- Recycling water from milking equipment, and tractor scraping manure and wastes from feeding lanes, rather than flushing with water, reduced water consumption by 68 percent on an 850-cow dairy.

- Water conservation practice preserved over 2.3 million cubic feet per year of lagoon waste water storage.
- Irrigation of processed waste water was reduced by 621 acre-inches per year.
- Research has shown that approximately 50 percent of the nitrogen applied from manure is available to the plant following the first year of application.
- Over 57 dairy farms have installed 91 waste storage ponds that can remove an average of 68.9 to 70.3 percent total solids, 80.2 to 82.4 percent volatile solids, 86.2 to 88.3 percent volatile suspended solids, 89.8 to 92.9 percent chemical oxygen demand, 54.9 to 73.1 percent nitrogen and 54.1 to 91.0 percent phosphorus from dairy waste water and runoff.

ACTIVITIES:

- Held field days, demonstrations, tours, meetings, one-on-one contacts, to promote water quality.
- Produced a video that targets practices to control runoff of wastewater and manure from dairy farms.
- Produced factsheets, newsletters, brochures, posters to promote project objectives.
- Forty-eight producers have installed over 38,000 feet of fencing to exclude livestock from water quality sensitive acres.
- To date, 80 nutrient management practices have been installed on 40,589 acres for salinity activities.
- Over 402 soil samples have been analyzed by the school laboratory.
- Shortcourse, safe handling, storage and application methods for pesticides are being used by over 115 growers, dairy operators and ranchers.
- Demonstrations reveal that irrigating 12 acre-inches of lagoon effluent on Coastal Bermuda grass pastures overseeded with winter annuals can produce as much as 20,000 lbs. of dry matter per acre per year.
- Project education and assistance efforts for non-point source pollution control have reached over 23,000 people during 1994.

OTHER AGENCIES: Soil and Water Conservation Board, Texas Agricultural Experiment Station, USDA-Agricultural Research Service, Environmental Protection Agency, Texas Water Commission, Milk Producers, Inc., and the U.S. Geological Survey.

REPORTING & EVALUATION: Monitor wastewater and runoff from 3 dairy farms;a program will be used to monitor concentrations of nutrients and chemical oxygen demand in runoff; monitor groundwater use and quality in relation to waste production, county data on well water quality will be compiled; sediment in impoundments and stream flood plains will be sampled and analyzed.

STATE: TEXAS **PROJECT SIZE:** 274,500 acres.
PROJECT NAME: SEYMOUR AQUIFER **STARTED:** 1991
COUNTIES IN PROJECT: HASKELL, KNOX
CROPS/LIVESTOCK: Cotton, peanuts, melons, wheat, grain, sorghum, hay, and vegetables.

OBJECTIVES: Reduce nitrates in drinking water and groundwater; reduce pesticide and bacterial contamination.

IMPACTS:

- The use of irrigation scheduling has increased by 4-5 times since 1992.
- Adoption of conservation cropping sequence and crop residue management in the project has decreased fertilizer use by 18 lbs/ac on 34,151 acres for a total of 614,718 pounds reduced.
- Conservation practices implemented have reduced potential amount of nitrogen leached by 2 lbs/ac on 34,151 acres for a total of 68,302 pounds reduced.
- Adoption of conservation practices with cover crops reduced nitrogen (NO_3-N) application by 10 lbs/ac on 20,400 acres for a total reduction of 204,000 pounds; same practice reduced nitrogen leached by 2.5 lbs/acre for a total of 51,000 pounds.
- Implementation of irrigation water testing reduced fertilizer applied by 2 lbs/acre on 7,700 acres for a total of 15,400 pounds reduced in 1994.
- Producers have increased irrigation efficiency by 7% after installing pipelines totalling 109,702 feet.
- Grass cover under the Conservation Reserve Program (CRP) has reduced nitrogen fertilizer use by 30 lbs./acre on 29,600 acres for a total of 888,000 pound of nitrogen reduced in 1994.
- Water tests conducted on irrigation wells show NO_3-N to average 8.9 mg/l for 1994. This represents a reduction from the 1993 average of 12.5 mg/l.
- Adoption of CRP practice for grass cover resulted in reduced phosphorus (P_2O_5) use of 40 lbs./acre on 29,600 acres for a total of 1,184,000 pounds reduced in 1994.

TEXAS SEYMOUR AQUIFER

ACTIVITIES:

- Water tests were conducted on 326 samples by project staff during the past year.
- Conducted meetings, trainings, conferences, tours, surveys, workshops, and field days to promote water quality.
- Published factsheets, newsletters, news articles, brochures.
- Conducted a free soil testing program for producers.
- Demonstrated irrigation management techniques such as scheduling use of flow meter, and water testing equipment.
- Tex*A*Syst program (Texas version of the Farm*A*Syst program is being implemented in FY94.
- Over 77 resource conservation plans were implemented on 17,000 acres.
- Integrated Pest Management practices resulted in 210 installations of improved pesticide applications on 52,500 acres in 1994.

OTHER AGENCIES: U.S. Geological Survey, TX Forest Service, TX Agricultural Experiment Station, Agricultural Research Service, TX Department of Agriculture.

REPORTING & EVALUATION: Water monitoring, soil and water sample analysis, monitor nutrient and pesticide movement; well testing; EPIC model will be used.

STATE: TEXAS **PROJECT SIZE:** 276,540 acres.
PROJECT NAME: LAKE FORK CREEK **STARTED:** 1991
COUNTIES IN PROJECT: HOPKINS, RAINS, WOOD

CROPS/LIVESTOCK: Wheat, rye, watermelon, sweet potatoes, dairy and poultry.

OBJECTIVES: Treat liquid wastes on-site; install animal waste management facilities; reduce nitrates, pesticides, phosphates and fecal coliform loading.

IMPACTS:

- EPIC simulation model predicted runoff losses of nitrogen, phosphorus, and sediment would be reduced by an average of 85%, 80% and 77% respectively.
- Approximately 102 tons of dairy manure was effectively utilized by 37 producers for nitrogen management practices on 2,920 acres.
- Proper manure application was reduced by 70 lbs/acre over 5,564 acres for a total of 389,480 lbs of nitrogen (NO_3-N) reduced.
- Adoption of waste utilization by 53 producers resulted in 613 tons of dairy manure being effectively utilized for phosphorus management practices on 3,770 acres.
- Proper manure application was reduced by 325 lbs/acre over 57,174 acres for a total 9,290 tons of phosphorus (P_2O_5) reduced.

ACTIVITIES:

- Over eighty radio programs were aired on water quality BMPs.
- A free soil testing program (800 samples) was provided for area producers.
- Published brochures, newsletters, factsheets, news articles, mailings, to inform the public and farmers about project goals.
- Conducted meetings, tours, seminars, workshops, conferences and training to promote water quality.
- Adoption of erosion control practices by 198 producers improved pasture and hayland planting on 5,880 acres.
- An estimated 3,948 tons of nitrogen, and 1,715 tons of phosphorus inorganic fertilizer was replaced with dairy manure as a fertilizer source on cropland.

OTHER AGENCIES: U.S. Geological Survey, Texas Forest Service, Texas Agricultural Experiment Station, USDA-Agricultural Research Service, Texas Department of Agriculture, Environmental Protection Agency.

REPORTING & EVALUATION: Monitor soil and sediment; evaluate runoff, economic analysis; STANNAS, EPIC (Erosion/Productivity Impact Calculator).

STATE: UTAH **PROJECT SIZE:** 197,000 acres.
PROJECT NAME: LITTLE BEAR RIVER **STARTED:** 1990
COUNTIES IN PROJECT: CACHE
CROPS/LIVESTOCK: Alfalfa, barley, wheat, corn, pasture; beef cattle.
OBJECTIVES: Reduce sediment and nutrient inputs; create quality fishery; reduce impacts from livestock grazing.

IMPACTS:

- Practices implemented have saved 3,924 tons of soil on 1219 acres in 1993 for a total of 4,783,356 tons.
- The amount of water saved on 254 acres was 3,418 acre-inches or 72,348 ac-ft. total.
- Increased irrigation efficiency by 4%.
- Fencing of livestock has improved grazing management on 9,888 feet.

ACTIVITIES:

- Implemented the following best management practices on cropland in watershed: nitrogen management = 13%, Phosphorus management = 13%, Pesticide management 13%, erosion/sediment control = 30%, irrigation water management = 5%.
- Used newspaper, television, news articles, radio broadcast, slide presentation to create public awareness about water quality concerns in the watershed.
- Conducted tours, presentations to increase public awareness.
- Promoted conservation planning and cost share programs.
- Conducted workshop on Pollution prevention to 4-H Youth.
- One-on-one contacts made to 100 landowners on water conservation and quality issues.
- Installed conservation practices for erosion control on 2064 acres of planned grazing.
- Completed agricultural conservation practice (ACP) contracts on 69 farms.
- Completed 645 acres in wildlife management.
- Sprinkler irrigation systems have been installed on 17 farms.

OTHER AGENCIES: Utah Department of Health, U.S. Dept. of Interior, U.S. Geological Survey, Ecosystems Research Institute, U.S. Forest Service, Utah Department of Agriculture, and the Ecosystems Research Institute.

REPORTING & EVALUATION: Evaluate rangeland condition; evaluate streambank/ channel erosion samples taken to test for coliform count and nutrient content, Farm*A*Syst program, NGNPS computer simulation data sheets, manure application planner Manure Application Planner (MAP) and Geographical Information System (GIS) procedures will be used.

STATE: UTAH
PROJECT NAME: OTTER CREEK/KOOSHAREM
COUNTIES IN PROJECT; PIUTE, SEVIER

PROJECT SIZE: 240,000 acres.
STARTED: 1991

CROPS/LIVESTOCK: Alfalfa, small grains, pasture, hay; beef, sheep, horses, wildlife - elk, deer, antelope, geese, and ducks.

OBJECTIVES: Reduce erosion; reduce levels of phosphorus, sediment, nitrates, and coliform counts.

IMPACTS:

- Integrated Pest Management strategies adopted by producers by their willingness to adjust harvest dates, resulted in reduced insecticide use by 80% - 90%.
- Irrigation water loss was reduced on 6 farms with three hundred acre feet conserved.
- Water conservation practices adopted with more effective use of irrigation water resulted in 40% increase in irrigation efficiency over 1,830 acres.
- Completed 76% of erosion/sediment control 5-year project goals for crop/hay.
- Completed 24% of irrigation water management 5-year project goal for crop/hay.

ACTIVITIES:

- Six hundred acres of cropland was converted to permanent pasture.
- Teen Council (15 youths) maintained and served trees and shrubs.
- Conducted tours for landowners, agency staff, elected officials and business leaders.
- Conducted demonstrations, field days, and one-on-one meetings.
- Planned and implemented cost share practices.
- Promoted conservation planning and cost share programs.

OTHER AGENCIES: Department of Health, Utah Department of Agriculture Utah Parks & Recreation, Bureau of Land Management, and U.S. Forest Service.

REPORTING & EVALUATION: Water sampling in the creek; and macroinvertebrate studies.

STATE: VERMONT
PROJECT NAME: LOWER MISSIQUOI
COUNTIES IN PROJECT: FRANKLIN, LAMOILLE

PROJECT SIZE: 247,000 acres.
STARTED: 1990

CROPS/LIVESTOCK: Corn, alfalfa, hay, pasture; beef, dairy, and beef cattle.

OBJECTIVES: Minimize agricultural impacts on surface and groundwater quality by improving management of crops, soils, and agricultural wastes; evaluate selected nutrient and pesticide Best Management Practices (BMPs); develop a public information and education program on improving water quality; survey groundwater within the project area by testing private wells.

IMPACTS:

- Adoption of waste storage structure by one farmer resulted in total savings of $328 per year.
- Integrated Crop Management strategies have been adopted by 5% of the producers in the watershed.

ACTIVITIES:

- Developed fact sheets, mailing list and brochures to promote project goals.
- Implemented well water testing, total number of wells sampled to date is 99.
- Conducted workshops and farm tours for farmers, vocational education teachers, high school students, and for home gardeners; mass media (new releases, radio, TV); bimonthly newsletter; poster display used at fairs and conferences; fact sheets on manure management and spreader calibration.
- Ten farms totalling 1,725 crop acres received

OTHER AGENCIES: Vermont Department of Agriculture, U.S. Fish, and Wildlife Service, Environmental Protection Agency, Lake Champlain Basin Program, Department of Environmental Conservation.

REPORTING & EVALUATION: Track BMP adoption; survey farmers; evaluate BMPs; use models to estimate trends in nutrient loadings; maintain computerized crop records; monitor well water and use models to assess risk in nitrate leaching.

STATE: VIRGINIA
PROJECT NAME: BLACKWATER RIVER
COUNTIES IN PROJECT: FRANKLIN

PROJECT SIZE: 176,000 acres.
STARTED: 1991

CROPS/LIVESTOCK: Hay, corn (silage), small grains (silage), corn (grain), tobacco, apples; dairy, beef, and horses.

OBJECTIVES: Reduce sediment and nutrient loadings in the watershed.

IMPACTS:

- Adoption of work utilization by 22 dairies and 2 beef farms on 6,461 acres resulted in an estimated 264,901 lbs. of nitrogen and 200,291 lbs. of phosphorus from manure being utilized rather than entering streams.
- After 2 years of water monitoring, the average fecal coliform concentrations for the downstream station dropped from 1,800 colonies/100 ml in 1991 to 1,100 in 1992.

ACTIVITIES:

- Conducted workshops, training, meetings, tours, one-on-one visits, field days to promote water quality and waste management.
- Published newsletters, news articles, brochures and fact sheets; modified nutrient management publication for state-wide use.
- Implemented practices such as terraces, strip cropping, and filter strips, rotational loafing lots, cattle stream crossings.
- Total resource conservation plans were developed on over 10,723 acres.
- To date, 16,477 feet of fencing has been installed primarily for erosion/sediment control, applied crop residues on 526 acres of land.
- To date, 16 wells have been tested in the project for common contaminants at 4 farmsteads; improved fencing for animal activities on over 12,352 feet.

REPORTING & EVALUATION: Water sampling, and on-site evaluation.

OTHER AGENCIES: Environmental Protection Agency , the Virginia Division of Soil & Water Conservation, U.S. Geological Survey, Blue Ridge Soil and Water Conservation District, Virginia Water Control Board, Ferrum College, and the Farm Bureau.

STATE: WASHINGTON
PROJECT NAME: GRANGER DRAIN
COUNTIES IN PROJECT: YAKIMA
PROJECT SIZE: 17,732 acres.
STARTED: 1991
CROPS/LIVESTOCK: Corn, pasture, asparagus, alfalfa, grapes, mint, orchards, wheat; beef, and dairy cattle.
OBJECTIVES: Reduce sediment and nutrient loadings; reduce bacterial level to the Yakima River.

IMPACTS:

- Monitoring efforts have resulted in an overall reduction of E.Coli at a level of 48% when compared to baseline data.
- In 1993, implementation of Best Management Practices resulted in reduced nitrogen (NO_3-N) application of 12.0 lbs/acre on 347 acres for a total of 4,164 lbs reduced.
- Fourteen dairy farms adopted water conservation plans that increased irrigation efficiency by 30%.
- 32% of interested persons in the Home*A*Syst program completed the Home*A*Syst package to educate rural landowners on reducing risks involved with degrading drinking water supply.

ACTIVITIES:

- To date, 26 irrigation water management plans have been written and 6 sites have been adopted to demonstrate manure management practices.
- Established a demonstration site for on-farm testing of manure applications.
- Published articles, newsletters, and factsheets to promote water quality.
- Conducted meetings, tours, and field days to promote project goals.
- Designed demonstration projects to support producer adoption of conservation practices and provided measurable and quantifiable information.
- Implemented 16 irrigation water management plans to date and 6 waste storage ponds towards reducing sediment and nutrient loadings.

OTHER AGENCIES: Environmental Protection Agency, U.S. Geological Survey, Yakima County Health Department, U.S. Bureau of Reclamation, and the Washington State Department of Ecology.

REPORTING AND EVALUATION: Water sampling, and data collection; Home*A*Syst program implemented in the project area.

STATE: WEST VIRGINIA
PROJECT NAME: GREENBRIER RIVER
COUNTIES IN PROJECT: GREENBRIER

PROJECT SIZE: 261,406 acres.
STARTED: 1990

CROPS/LIVESTOCK: Hay, grain, pasture, tobacco; beef, dairy, poultry, swine, sheep, cattle and turkey.

OBJECTIVES: Reduce fecal coliform bacteria and levels of nitrates in wells; improve manure management; control erosion and sediment.

IMPACTS:

- Installation of 7 animal waste facilities has resulted in an estimated 6751 tons of manure being properly applied on 393 acres per year for a total of 2,653,143 tons reduced.
- To date, the analysis of net marginal benefits from integrated crop management has documented an average savings of $32.27/acre on a total of 835 acres for a total cost savings of $26,945.
- In FY 1993, the implementation of conservation practices resulted in reduced sediment load of 662 tons on 68 acres of cropland and 9444 tons on 2,862 acres of pastureland.
- Implementation of best management practices resulted in reduced nitrogen (NO_3-N) application rate of 20 lbs/ac over 1728 acres for a total of 34,560 lbs, and phosphorus (P_2O_5) application rate of 80 lbs/ac over 1728 acres for a total of 138,240 lbs. reduced.

ACTIVITIES:

- Developed slide presentations for use in the watershed.
- Pesticide and nutrient management plans were developed for more than 1064 acres of cropland.
- Held tours, meetings, workshops, and demonstrations to promote project goals.
- Published and distributed brochures, newsletters, and factsheets to over 700 producers within the watershed.
- Implemented crop management program by promoting manure testing, pesticide use and erosion control within the project.
- With 8,500 acres in the project needing water quality practices, 25%, 27%, 21%, and 27% of goals for nitrogen, phosphorus, pesticide and erosion/sediment control practices respectively have been accomplished.
- Implemented 80 long term agreements to date.

OTHER AGENCIES: U.S. Geological Survey and the Agricultural Research Service.

REPORTING & EVALUATION: Mathematical modeling will be used to assess impacts of land use and practices, with AGNPS, EPIC, or SWRRB.

STATE: WISCONSIN **PROJECT SIZE:** 71,000 acres.
PROJECT NAME: STEVENS POINT/WHITING/PLOVER WELLHEAD PROTECTION **STARTED:** 1990
COUNTIES IN PROJECT: PORTAGE
CROPS/LIVESTOCK: Irrigated potatoes, snapbeans, peas, sweet corn, field corn; dairy, and beef cattle.
OBJECTIVES: Reduce excessive leaching of nitrates and pesticides to groundwater; expand the adoption of Integrated Crop Management (ICM) practices among farmers on 75% (approximately 19,500 acres) of the cropland acres; accelerate adoption of Groundwater Smart* practices by farmers and homeowners.
IMPACTS:

- One farmer reduced commercial nitrogen fertilizer purchases by 70% on corn, resulting in $20 per acre savings.
- Economic savings due to reduction in nutrients saved farmers nearly $20,000 in input costs.
- Adoption of best management practices have resulted in $11.35 per acre savings on over 2,800 acres for a total savings of $31,780.
- Conducted tours, on-farm demonstrations, field days, one-on-one contacts, and meetings to promote water quality.
- One-on-one interviews have shown that farmers partcipating in ICM are about 50 percent more knowledgeable about groundwater protection practices than non-cooperating farmers.
- To date, 30 of the 55 full-time farmers (55 percent) are applying ICM related practices on 7,414 acres.
- Effective nutrient management plans adopted by producers resulted in reduced nitrogen (NO_3-N) application of 10 lbs/acres over 7,417 acres, and reduced phosphorus (P_2O_5) applications of 11 lbs/acre over 7,417 for a total of 74,170 pounds of nitrogen and 81,587 pounds of phosphorus reduced.
- Adoption of water management practices over 5,973 acres has increased irrigation efficiency by 10 percent.
- With the NLEAP model, the estimated total reduction in nitrate loading to groundwater implementation in 1994 is 50,513 pounds, or an average of 6-8 pounds per acre.

ACTIVITIES:

- To date, all of the 55 full-time farmers have completed a Farm-A-Syst.
- Over 264 drinking water samples were analyzed for common contaminants.
- The circulation of publications such as Well Street Journal, Better Homes and Groundwater, has increased public and producer awareness of reductions in nutrient and pesticide use.
- Implemented five farm tours/demonstrations addressing Integrated Crop Management (ICM), irrigation scheduling, fuel storage and manure handling, Farm-A-Syst, barnyard management, better homes and groundwater.
- Developed a video on "properly abandoned well techniques" for homeowners
- Several farmers are switching pesticides to those with lower leaching potentials.

OTHER AGENCIES: Agricultural Research Service, Resource Conservation District, WI Department of Natural Resources, and Portage County Planning and Zoning, and Spiritland agri-services.
REPORTING & EVALUATION: Data collected from water samples, Nitrate Leaching and Economic Analysis Package (NLEAP) computer program to be used for modeling; utilize Farmstead Assessment System (Farm*A*Syst), and use of Field Practices Inventory Survey.
*Smart - Sustaining and Managing Agricultural Resources for Tomorrow.

STATE: WYOMING
PROJECT NAME: OCEAN LAKE
COUNTIES IN PROJECT: FREMONT
PROJECT SIZE: 81,200 acres.
STARTED: 1990
CROPS/LIVESTOCK: Alfalfa, hay, barley, beans, grass, corn, sugarbeets, dairy, and sheep.
OBJECTIVES: Reduce sediment loadings in the watershed.

IMPACTS:

- Adoption of management plans for irrigation water practices resulted in improved irrigation efficiency of 9.3 percent.
- Demonstrations have shown water savings of as much as 50% and a decreased crop nitrogen requirements (due to better efficiency and uniformity of application) of about 30%.
- Positive changes in agrichemical usage and fertigation are being adopted more readily.
- Increased wildlife habitat in irrigation drains attracts additional public support for the project.

ACTIVITIES:

- Application of erosion/sediment control practices resulted in the installation of 66 irrigation pipelines on 80, 495 feet, 3,840 acres of pasture and hayland management and improved irrigation efficiency on over 2,277 acres.
- Developed slide shows, video clips, radio shows, newspaper articles about the watershed.
- Developed and distributed surge valves.
- Developed better understanding and relations with neighboring Indian Tribes relative to the project.
- Developed the Farm*A*Syst water quality program.
- Over 300 wells have been tested for potable water quality.
- Conducted tours, demonstrations, field days and on-one-one sessions on project awareness.

OTHER AGENCIES: Midvale Irrigation District, Save Ocean Lake Committee, Fremont County Commissioners, Town of Pavillion, Fremont County Recreation Commission, Wind River Recreation Board, Wyoming Department of Environmental Quality, Wyoming Game and Fish Department, U.S. Geological Survey, U.S. Bureau of Reclamation, Wyoming Department of Agriculture, Wyoming Water Development Commission, Wyoming State Engineer's Office, University of Wyoming (UW) Water Resources Center, UW Agricultural Experiment Station, Environmental Protection Agency, U.S. Fish and Wildlife Service.

REPORTING & EVALUATION: Baseline and mid-term water quality data are being developed by the University of Wyoming, on contract with Wyoming SCS. Sampling and analytical protocol established in this study will be considered in ongoing; Farm-A-Syst is being implemented.